TECHNOLOGY DEPT.

the OIL AND GAS JOURNAL

GETTING READY TO REPLACE DRILL-STEM?

Hughes flash-weld tool joints make more hole for your drilling dollar

Hughes Flash-Weld Tool Joints are built to last the life of your drill-stem.

Hughes Flash-Weld Tool Joints eliminate two-thirds of the threaded connection.

Hughes Flash-Weld Tool Joints eliminate time, trouble and expense of replacing worn tool joints.

In fields where abrasive wear is excessive, Hughes Flash-Weld Tool Joints can be rehard-faced at the rig location, safely and economically, using the field-tested technique developed by Hughes Tool Company.

Experienced Hughes representatives will be glad to discuss that replacement string with you at any time.

HUGHES TOOL COMPANY HOUSTON, TEXAS

World Standard of the Industry

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PRICE 50 CENTS TABLE OF CONTENTS PAGE 41 MAY 11, 1950

XUM

5 reasons why you should use HORTONSPHERES for storing highly volatile petroleum products . . . . .

1. They provide a means of storing butane, butane-propane mixtures, and volatile refinery charging stocks. None of the contents of the tank are lost as long as the internal pressure does not exceed the setting of the pressure relief valve.

2. They have a long service life. Corrosion inside the sphere is retarded because oxygen and water vapor are not drawn in through the vents as a result of temperature changes.

3. Their maintenance cost is low because the entire structure is supported above the ground on columns, thus making all parts readily accessible for inspection and painting.

4. They reduce the danger of fire because the vapor in a Hortonsphere does not contain enough oxygen to propagate a flame.

5. They furnish economical storage. The spherical shape utilizes material to the best advantage resulting in a low annual cost per barrel of storage for liquids requiring storage pressures of 25 lbs. per sq. in. or more.

Design Pressures

Standard installations are built for the storing of volatile liquids ranging from 30 to 250 lbs. per sq. in.

Hortonspheres for gas storage are built for pressures ranging from 20 to 100 lbs. per sq. in. or more.

Standard Capacities

Include units up to 1,000,000 cu. ft. for gases, or 25,000-bbl. capacity for liquids.

Bulletin F contains information on Hortonspheres. Write our nearest office for your copy.

Above: Two 10,000-bbl. Hortonspheres at the Shell Oil Company's Norco, Louisiana, refinery. They are used to store butane under 75 lbs. per sq. in. pressure.

CHICAGO BRIDGE & IRON COMPANY

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PENNSYLVANIA

Atlanta, 3.....2154 Healey Bldg.
Birmingham, 1.....1536 North 50th St.
Boston, 10.....1025—201 Devonshire St.
Chicago, 4.....2128 McCormick Bldg.
Cleveland, 15.....2204 Guildhall Bldg.
Detroit, 26.....1514 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston, 2.....2119 National Standard Bldg.
Los Angeles, 17.....1523 General Petroleum Bldg.
New York, 6.....3347—165 Broadway Bldg.
Philadelphia, 3.....1615-1700 Walnut Street Bldg.
Salt Lake City, 4.....525 West 17th South St.
San Francisco, 11.1254—22 Battery Street Bldg.
Seattle, 1.....1325 Henry Bldg.
Tulsa, 3.....1606 Hunt Bldg.

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Horton Steel Works, Limited, Fort Erie, Ontario, Canada
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Comprime N.V., Amsterdam—O, Netherlands

XUM

XU

"Around here, we never waste a dime"

"We check the cost of everything. Compare brands, run tests. Wire rope? Sure we check on rope — performance, life, costs of the actual work it does. That way, it's possible to tell which brand is cheapest in the long run."

Smart buyer! His records have shown him that cost per unit of work, not purchase price, is the only sound basis for calculating rope expense.

His records have shown him, too, that whenever he specifies Bethlehem rope, he's making a solid buy . . . one that will give him his money's worth and more. There's no finer rope made — a fact that you yourself can easily verify.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM WIRE ROPE

BETHLEHEM STEEL

When you think WIRE ROPE . . . think BETHLEHEM

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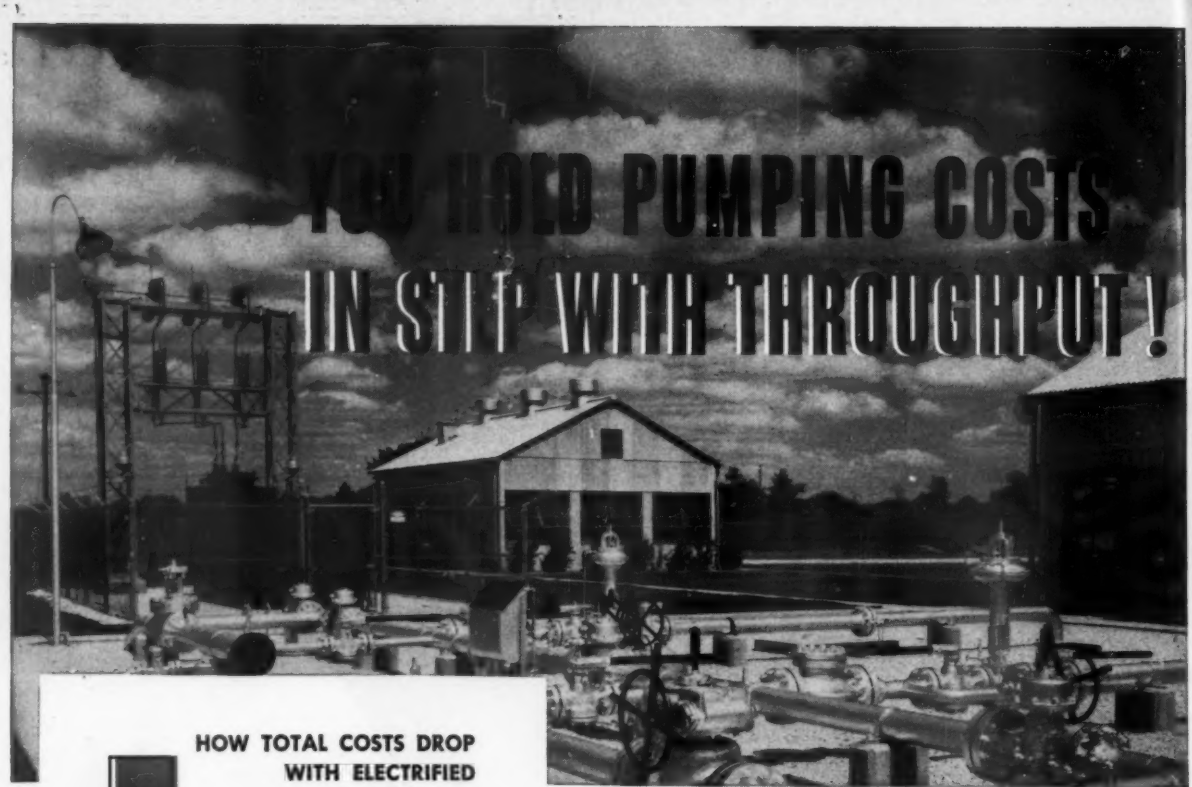
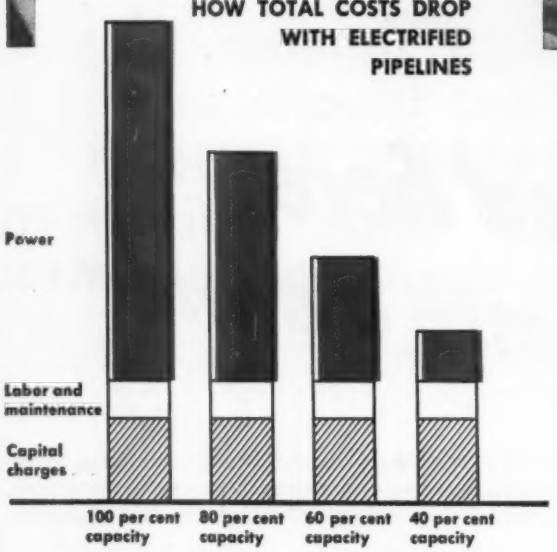
XUM



HOW TOTAL COSTS DROP WITH ELECTRIFIED PIPELINES



With electric power, maintenance and labor costs are low and total operating costs drop sharply at reduced capacities, as this chart shows. Actual capacity factor of the nation's pipelines has always averaged less than 100 per cent annually, has even gone as low as 37.3 per cent.

DON'T MISS IT! Ask your G-E representative about a showing of "Lease on the Future," G-E's More Power to America program on how the oil industry is applying electric power with profit.

With electrical equipment, capital charges, labor and maintenance are low. Total operating costs with electrical equipment drop sharply as throughput goes down . . . and less power is used. This makes total operating costs correspond closely to throughput instead of being pegged at a high level. And here are other savings:

Reduces initial investment cost Lowest-cost equipment for oil pipeline pumping is the electric-motor-driven centrifugal pump.

Releases manpower for other duties Electric equipment needs little attention, lends itself readily to automatic control that further saves manhours.

Simplifies operation Automatic control minimizes the chances of human error, permits centralizing controls for greater efficiency.

Lowers maintenance costs Electric motors cost less to maintain than any other type of drive.

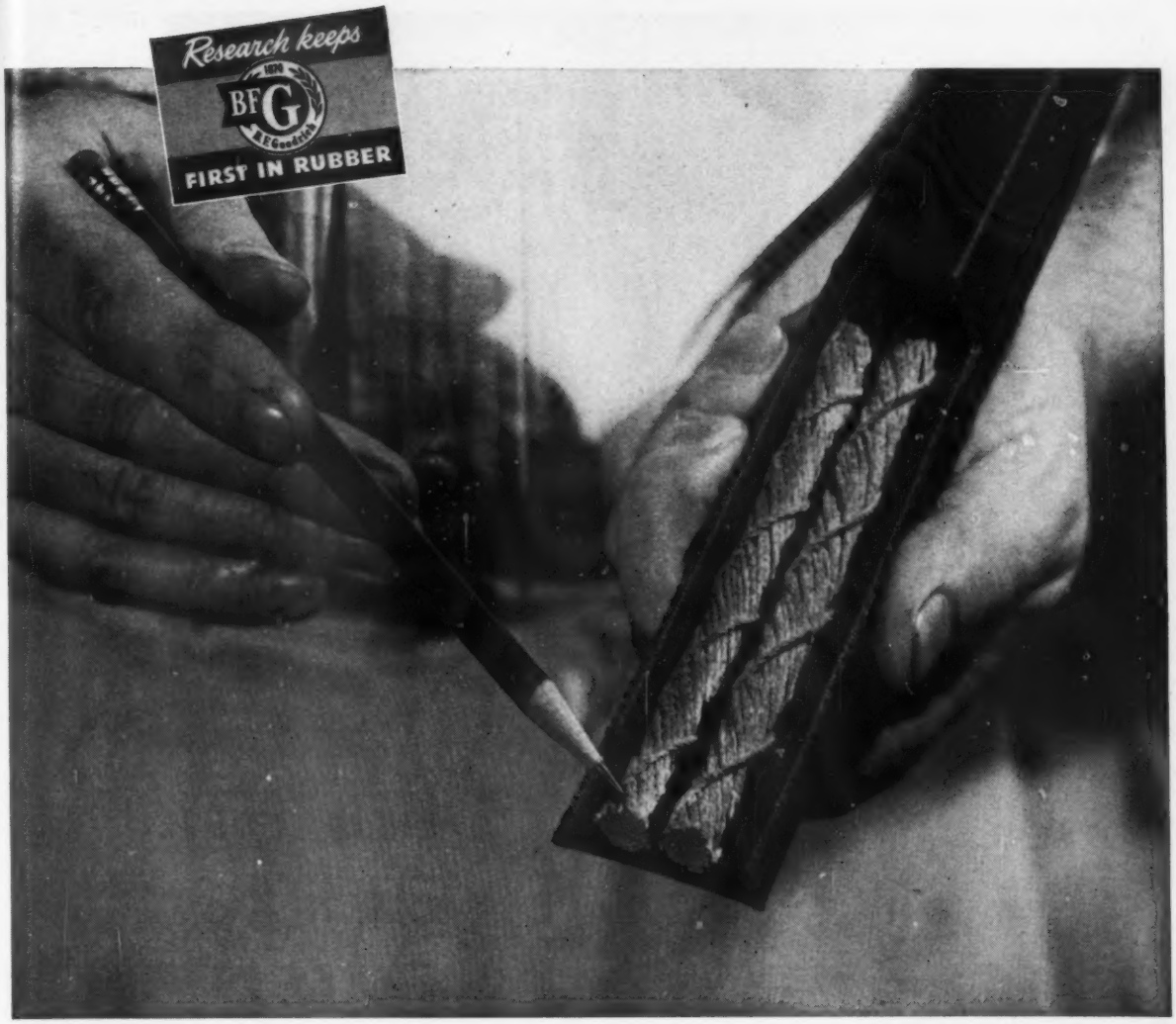
WHEN YOU "GO ELECTRIC," GO GENERAL ELECTRIC!

Here's what you get: (1) Everything electric you need from an extensive range of quality products. (2) Helpful services of skilled application engineers familiar with pipeline industry needs. (3) A complete, integrated electrical system when G.E. co-ordinates the selection, manufacture and shipment of all the equipment required. (4) Quick servicing of any G-E apparatus from the nearest of 30 service shops.

To electrify efficiently, call your nearest G-E office first. *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

Everything you need to cut oil pipeline costs —ELECTRICALLY!

GENERAL ELECTRIC



How twin grommets reduce belt failures

B.F.Goodrich grommet V belts last 20 to 50% longer

WHEN an ordinary V belt enters the sheave, the center cords are forced down and away from the center where the load is carried. Belt men call this "dishing" because the cord section becomes concave like a dish. With the new B. F. Goodrich V belt there are no center cords, no "dishing." Here's how it works —

All cords are put to work — Twin grommets are placed close to the driving faces of the belt. All the time the belt is in the pulley, the grommets keep working close to the driving surfaces. The load is evenly distributed. In laboratory tests, grommet V belts actually lasted 20 to 50% longer.

Every part is flexible — Because a grommet V belt has no stiff overlapping section, every part is equally flexible. Better grip, less slip. Grommet V belts give ⅓ more gripping power, pull heavier loads with a higher safety factor.

Endless grommets reduce belt failures — Most of the failures in ordinary belts occur where cords overlap. But in the B. F. Goodrich grommet V belt the cord section is *endless* — made by winding heavy cord on itself to form an endless loop. These are twin cord sections, *not ordinary cables.*

No other V belt has it — Twin grommet construction is found only in B. F. Goodrich V belts. (U. S. Patent No. 2,233,294.) It's a premium construction feature that costs you no more. At present made in D and E sections only. Ask your local B. F. Goodrich distributor to show you his "X-ray" belt that clearly illustrates grommet construction. *The B.F.Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Grommet V Belts BY
B.F.Goodrich

XUM

STANDARD OIL tells its fellow-citizens about its 1949 operations. This advertisement, the third in Standard Oil's 1950 institutional series, appears in 150 newspapers and a selected list of farm publications throughout the Midwest.

THIS SPRING, census-takers are calling on homes all over America. Suppose one of them called on us and asked some of the same questions she asks you. Here is what our answers would be:

IF THE CENSUS-TAKER CALLED TODAY, THIS IS WHAT WE'D TELL HER

QUESTION: *Your name, please?*
ANSWER : Standard Oil Company (Indiana). We speak also for our subsidiary companies.

QUESTION: *Age?*
ANSWER : We'll be 61 years old this coming June.

QUESTION: *Occupation?*
ANSWER : We produce crude oil, transport it, refine it into more than 2,000 useful products and distribute these products for sale. Doing each of these things ourselves, as an integrated company, helps us make better products more economically and make them more readily available.

QUESTION: *How many in your immediate family?*
ANSWER : First of all, 46,700 employees. Stan Zatorski is one—he works at our refinery in Whiting, Indiana. Our employees averaged $4,600 in wages and benefits last year, and each of them has behind him an average of $30,100 in tools and equipment to help him earn his good living.

We have more than 2,300 retired employees, like Lee Swanson of Sidney, Montana, each of whom receives monthly income checks under our contributory retirement plan.

Then we have 96,800 owners, like Mrs. Klare Knudson, a housewife of Minneapolis. In 1949 our stockholders owned an average of 158 shares, on which dividends paid had a value of $425. No one man or woman owns as much as 1% of our stock, and no institutional owner has as much as 5%.

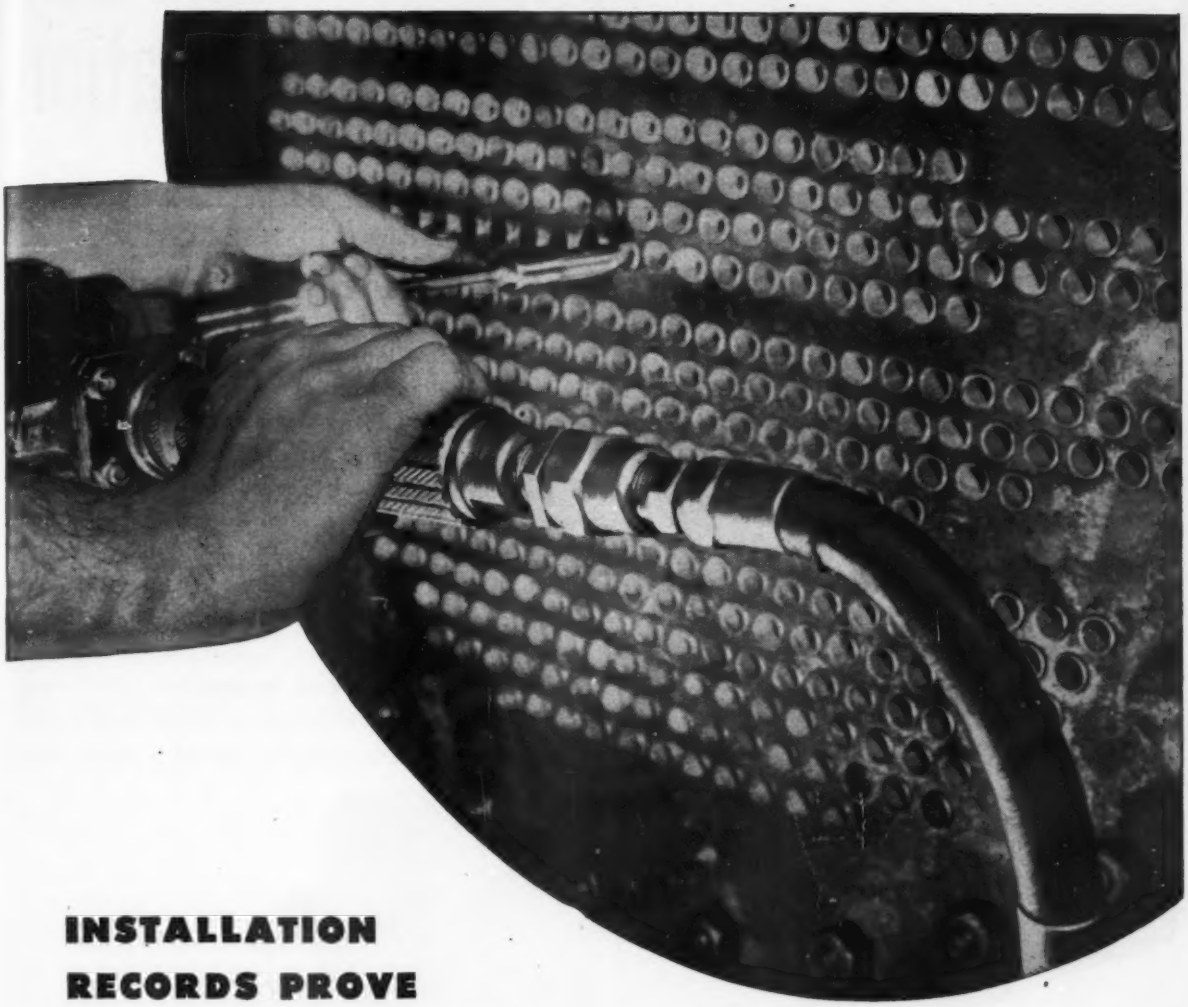
QUESTION: *Any other dependents?*
ANSWER : Well, there are a good many other people who depend on us to some extent—and at the same time, we depend on them. There are many thousands of independent businessmen like Sam Reeve of Birmingham, Michigan, who earn their living by selling our products. There are millions of customers like Joseph Carawab of Chicago who use our products.

And there are a great many people who benefit from the work of the many schools, colleges, hospitals, charities, insurance companies and other institutions that get part of their income from our stock.

QUESTION: *How do your spend your income?*
ANSWER : The greater part of it—58.7 cents out of every dollar we took in last year—was our cost for materials, transportation and wear and tear. Another 16.4 cents went for wages, salaries and employee benefits. 2.9 cents was paid to our owners as dividends and 4.8 cents was retained in the business. These items add up to 82.8 cents.

The remaining 17.2 cents out of every dollar we took in last year went to pay taxes, including our own taxes and those we collect from our customers for national, state and local governments.

STANDARD OIL COMPANY (INDIANA)



INSTALLATION RECORDS PROVE

ELECTRUNITE TUBES ALWAYS ROLL-IN SMOOTHLY... due to the consistently high ductility and size uniformity throughout every carbon and stainless steel pressure tube made by the modern ELECTRUNITE Process. Try them and find out for yourself. Write today for full information.

REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION • CLEVELAND 8, OHIO
Export Dept.: Chrysler Building, New York 17, N.Y.

REPUBLIC STEEL

Republic
ELECTRUNITE
BOILER, CONDENSER AND HEAT EXCHANGER TUBES

XUM

Pipe cut and beveled in ONE operation

. . . Fast . . . Accurate . . . Economical

This Magnolia Airco Pipe Beveling and Cutting Machine provides the fastest and most economical method of preparing pipe for welding. It is quickly adjustable for any bevel or straight edge cut and leaves pipe ends clear and free from burrs, slag and scale.

When equipped with two torches, the machine provides a speedy way to cut out frozen fittings, and simultaneously bevel the pipe for rewelding. No power is needed. Either the pipe is turned or is held stationary. In either case, the turning of a crank, as shown here, causes the machine to travel around the pipe. It is light enough to be carried and set-up by one operator.

Magnolia Airco Testing Machine for quick, accurate weld tests

The Magnolia Airco Portable Tensile and Guided Bend Testing Machine permits rapid testing of weld specimens in shop, laboratory or in the field. An outstanding advantage of this machine is its ability to perform not only the longitudinal all-weld metal and reduced section transverse tension tests, but also guided bend tests. An auxiliary hand on the gauge stops at the point on the dial where breakage occurs.

The machine is sturdily constructed and works on the hydraulic principle. Test loads up to 150,000 p.s.i., or higher, may be applied by selection of proper cross-sectional area of test specimen.

• • • • •

Catalog ADC 640 gives more information on the two machines illustrated here, as well as the rest of the complete, comprehensive Magnolia Airco line. If you would like a copy write to Dept.PX-8275, Magnolia Airco Gas Products Company, General Offices, Houston 1, Texas.

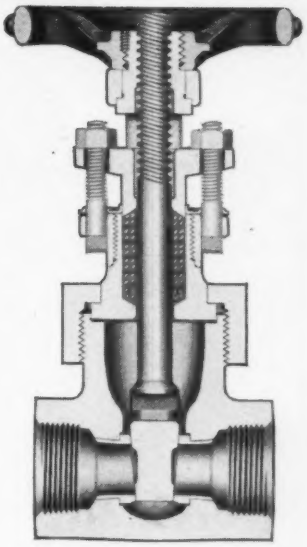
AIRCO AIR REDUCTION MAGNOLIA COMPANY

A Division of Air Reduction Company, Incorporated

Houston • Beaumont • Corpus Christi • Wichita Falls
El Paso • Fort Worth • San Antonio • Dallas

Southwestern Headquarters for Oxygen, Acetylene and Other Gases . . . Carbide . . . Gas Welding and Cutting Machines, Apparatus and Supplies . . . Arc Welders, Electrodes and Accessories

Big help to any standardization plan ...the complete CRANE line



No. 3602X, 600-Pound Small Steel Gate for oil or oil vapor up to 1100° F. Exelloy to Exelloy seating. Sizes: ¼ to 2-inch. Screwed or welding ends.

MODERATELY PRICED SMALL STEEL VALVES

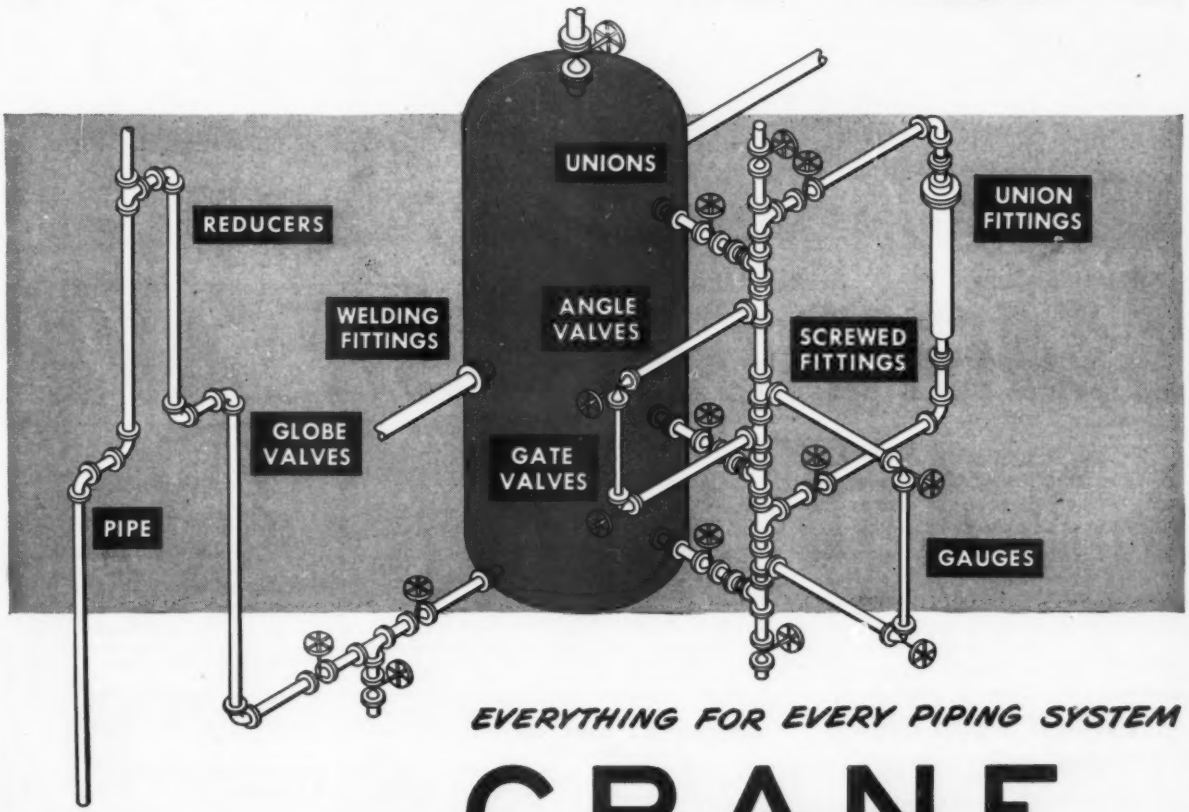
Why moderately priced? Because of Crane Co.'s better facilities for *quality* mass production. Designed to withstand tough services, Crane Small Steel Gates provide extra strength and safety under piping and pressure strains, and extreme temperature variations.

These rugged, compact valves are easy to service . . . easy to operate. Husky union bonnet ring with long thread engagement pulls up easily, stays tight, protects against distortion when valve is opened. T-head disc-stem connection gives flexibility for smooth operation. Fully guided solid wedge disc cannot get out of line, drag on seating surfaces, or jam in body.

Little routine maintenance required. Deep stuffing box with one-piece gland and gland flange assures tight stem seal. Outside screw and yoke construction keeps stem threads out of contact with line fluids, simplifies lubrication. See your No. 49 Crane Catalog, or write for Circular AD-1741.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

ONE ORDER TO CRANE COVERS ALL PIPING NEEDED FOR THIS GAUGE GLASS HOOK-UP, FOR EXAMPLE

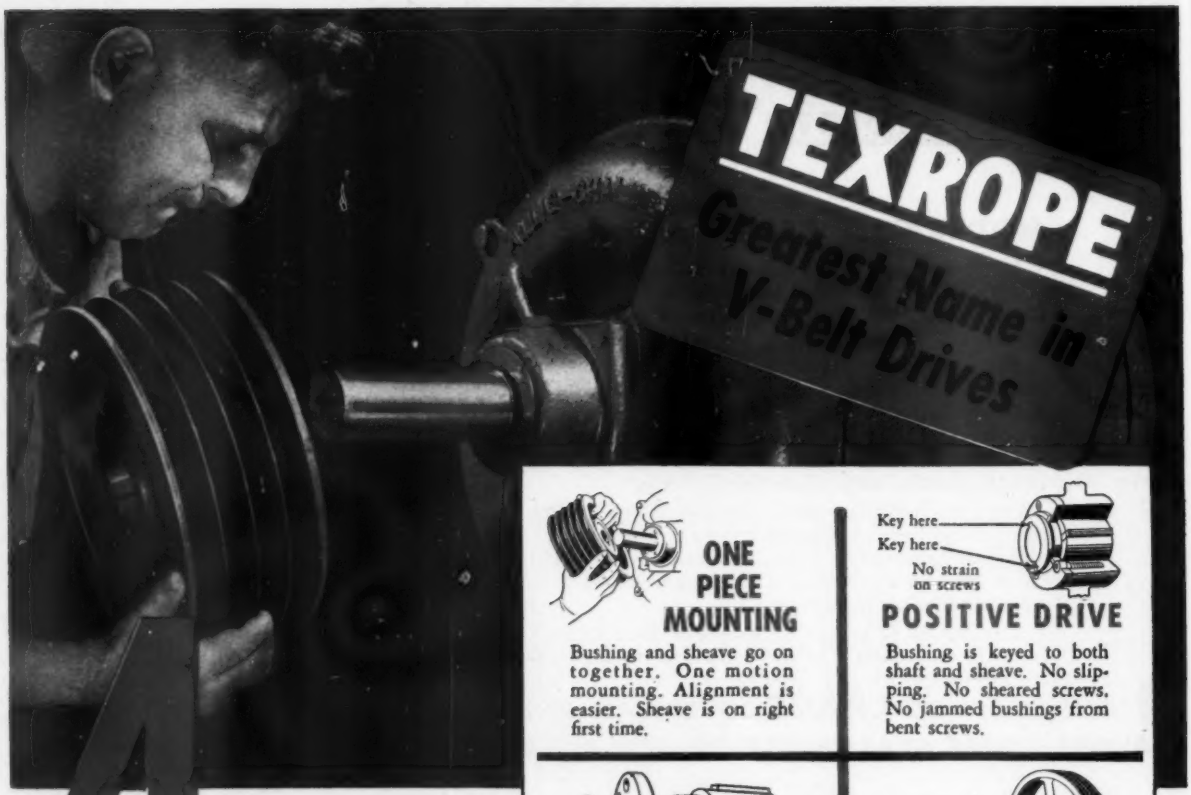


EVERYTHING FOR EVERY PIPING SYSTEM

CRANE

VALVES • FITTINGS • PIPE • PLUMBING AND HEATING

XUM



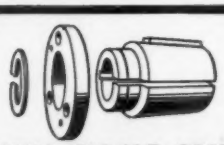
4 BIG ADVANTAGES!

ONE PIECE MOUNTING

Bushing and sheave go on together. One motion mounting. Alignment is easier. Sheave is on right first time.

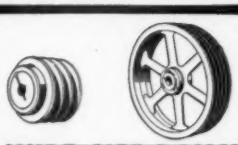
POSITIVE DRIVE

Bushing is keyed to both shaft and sheave. No slipping. No sheared screws. No jammed bushings from bent screws.



FULL CIRCLE GRIP

Bushing split full length with separate collar. Grips shaft full length around full diameter. No forcing or distortion. Grip easily broken. No hammering.



WIDE SIZE RANGE

Magic Grip sheaves are available from 3" pitch diameter up. Style NC bushing for smaller sizes and Style C bushing for larger sizes.

MAGIC GRIP SHEAVE

YOU CAN MOUNT a *Magic Grip* sheave faster than any other sheave you can buy . . . and demount it just as fast. When you mount a *Magic Grip* sheave it runs true. It will not slip or jam. It always comes off easily.

Even if you don't change sheaves often, you should have *Magic Grip* sheaves on every drive to eliminate the possibility of shaft and bearing damage when ordinary sheaves are hammered or pried on or off.

WIDEST V-BELT LINE

Get everything you need for your V-belt drives from one reliable source. *Texrope* offers the broadest line of V-belts, standard and variable speed sheaves and speed changers in the industry. And you also get the extra engineering skill that comes from having more industrial V-belt installations than any other manufacturer.

Get your copy of the 144 page *Texrope* Pre-Engineered Drive Manual from your A-C Authorized Dealer or Sales Office or write for Bulletin 20B6956.

A-3022

ALLIS-CHALMERS, 1059A SO. 70 ST.
MILWAUKEE, WIS.

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

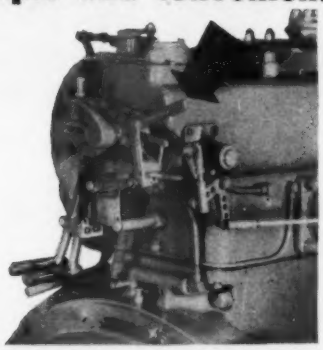
Texrope and *Magic Grip* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

MURPHY DIESEL

DUAL-FUEL Engines . . .

Fuel Changeover is simple and convenient



Simplicity is the keynote of Murphy Dual-Fuel operation — start the engine on diesel fuel and warm it up. Throwing one lever (see arrow above) switches the engine to dual-fuel operation. That's all there is to it!

. . . give you . . .

- Greater Economy
- Rugged Construction
- Longer Life
- Quick Starting
- Standby Protection
- Compactness
- Simplicity of Design
- Heavy Duty Power
- Relative Lightweight
- Simpler Operation — No Complicated Adjustments
- Instant Fuel Change — Insures Continuous Operation
- Full Power on Either Fuel Without Additional Parts

Write for a copy of Bulletin 107, today. It gives full details.

See Your Murphy Diesel Dealer

LOS ANGELES, CALIFORNIA
Engine Sales & Service
SAN ANTONIO, TEXAS
J. E. Ingram Equipment Co.
EVANSVILLE, INDIANA
Pershing Equipment Co.
KILGORE, TEXAS
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AMARILLO, TEXAS
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HOUSTON, TEXAS
Houston Engine & Pump Co., Inc.
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MURPHY DIESEL COMPANY

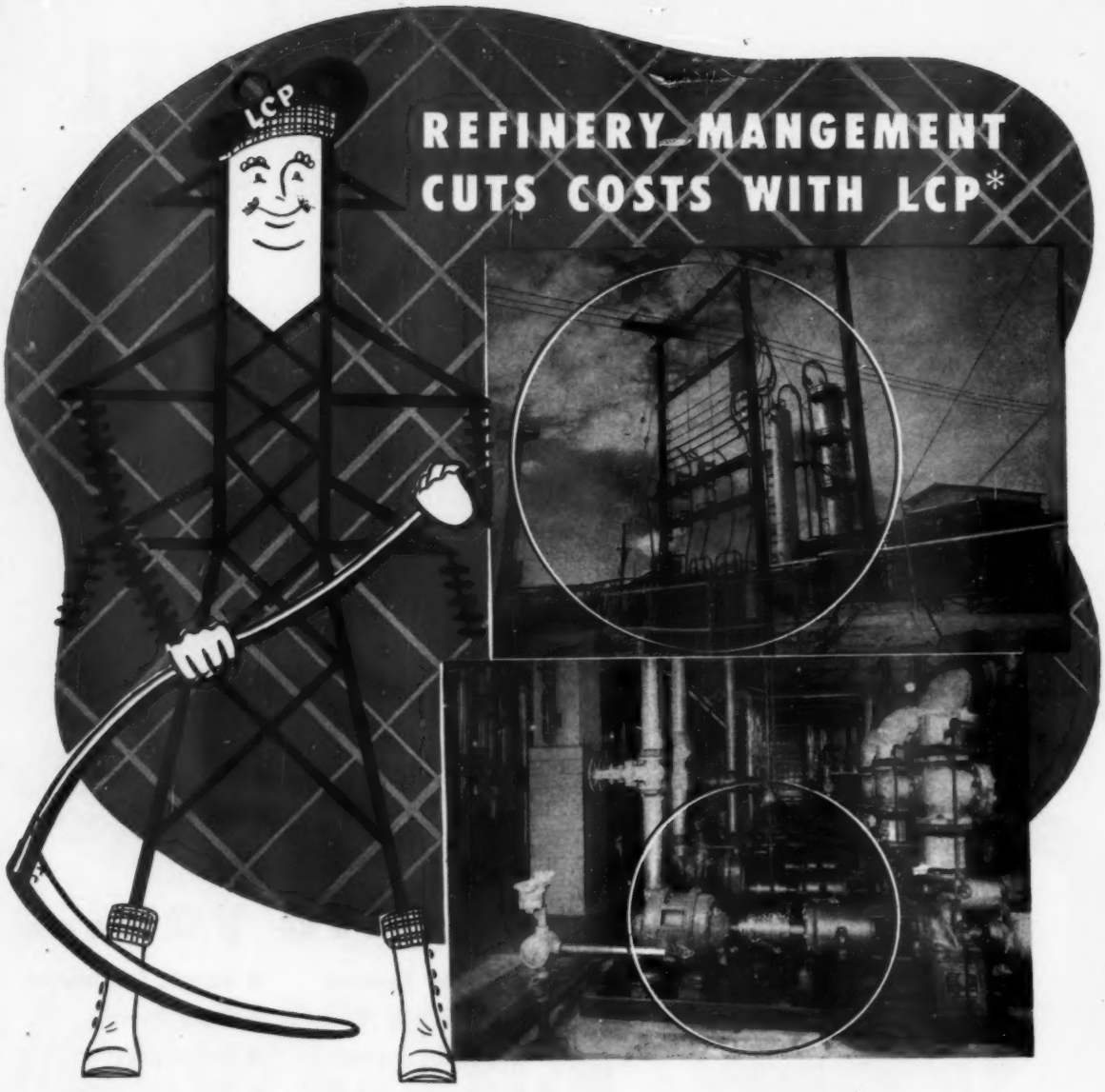
5305 W. Burnham St., Milwaukee 14, Wisconsin

OIL INDUSTRY FACTORY BRANCH — Sales, Parts and Service: 113-117 South Elwood Street, Tulsa, Oklahoma

Diesel Engines and Power Units, 90 to 220 H.P.; Dual-Fuel Engines, 135 to 185 H.P.; Generator Sets, 60 to 133 K.W.; Also Crude Oil Engines.

XUM

REFINERY MANGEMENT CUTS COSTS WITH LCP*



MORE and MORE REFINERIES USE *LCP EVERY DAY!

Always on the job—that's me! And with refiners that's what counts! No costly shut-down time when I'm delivering my constant, trouble-free service! I can take on a 24-hour shift or work according to any fractional time schedule. Automatic control does the trick—and saves you money on maintenance and labor. The Power Engineer of your Utility Electric Power Company has files galore on successful power conversions. Get the facts from him!

*LOW COST POWER

PETROLEUM ELECTRIC POWER ASSOCIATION

Super Equipment Builds The "Super Inch"

...World's Largest Pipe Line

Pipe line, process plant, industrial installation or heavy construction project—Bechtel has the equipment and the men who know how to use it.

BECHTEL CORPORATION

Los Angeles • **SAN FRANCISCO** • *New York*
Tulsa

"BUILDERS FOR INDUSTRY"

DESIGN • ENGINEERING • CONSTRUCTION

O-C-T

Announces a 20,000 pound test AUTOMATIC FLOATING SEAL

Again, O-C-T offers an advanced design casing head, engineered to meet definite field needs and save the industry time and money. This new O-C-T C-18-H Casing Head brings new simplicity and flexibility to the low price - high pressure head field along with an extra margin of safety. Quality which results in dependability has been stressed throughout the design and manufacture. Check and compare these O-C-T C-18-H features and advantages.

1. The Automatic Floating seal is tested to 20,000 lbs.

2. The seal unit is separate from the slips. Thus, the test load is applied to the automatic sealing element and not to the slips. This feature removes any possibility of collapsing or crushing the pipe with test loads.

3. The test load is applied to the heavy bevel on the body.

4. Allen screws have been eliminated from the design and well pressure is utilized to equalize the seal all around the pipe.

5. All extra heavy seals are backed up by extrusion rings which conform to the plus or minus API tolerance of the casing.

6. Corrosive gas and fluids are sealed off from the API Metal Ring Gasket between flanges.

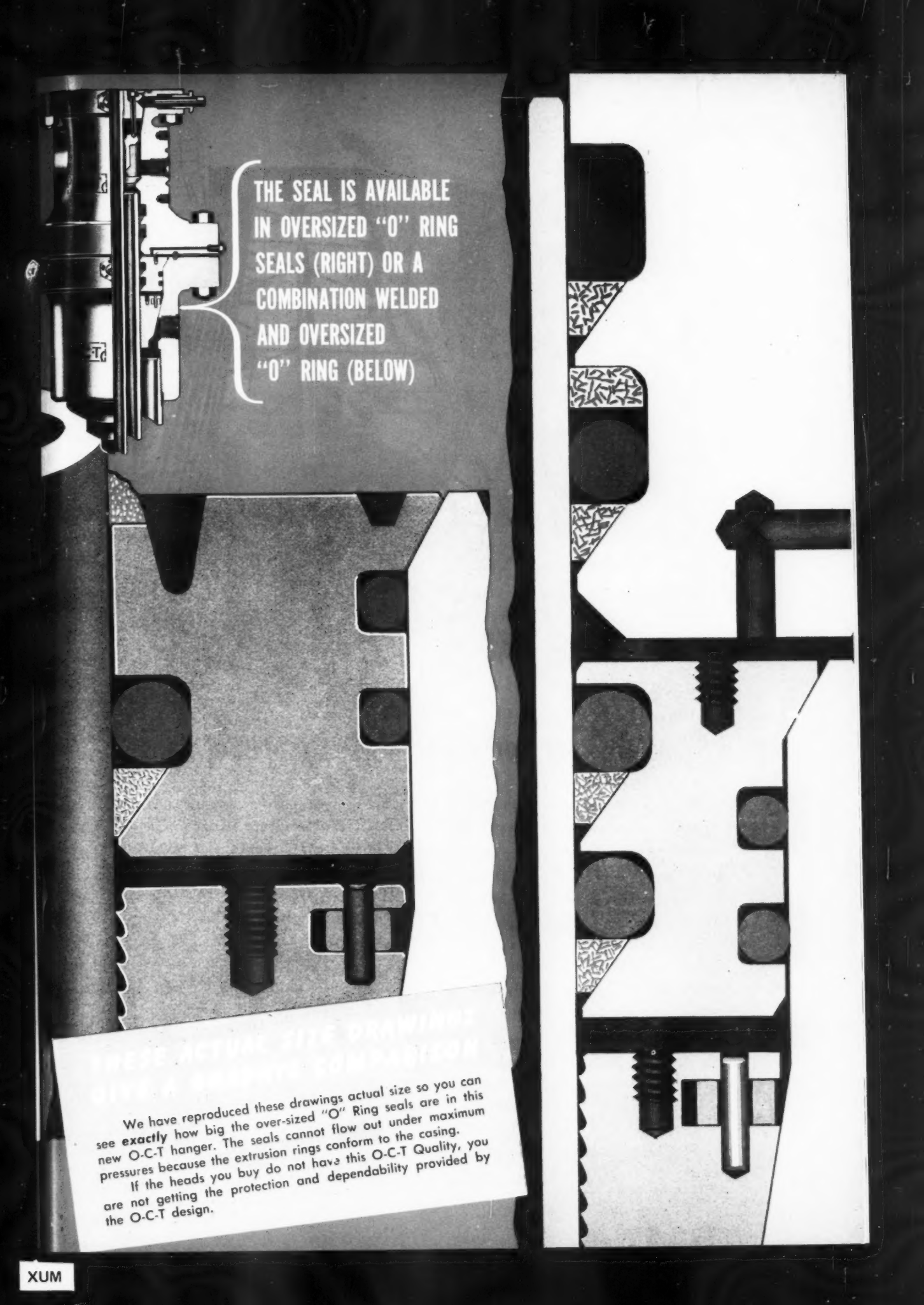
Write today or ask your O-C-T representative for complete engineering specifications and prices. O-C-T Products are always dependable and available through more than 700 conveniently located supply stores.

OIL CENTER TOOL COMPANY

P. O. BOX 3091 HOUSTON, TEXAS

O-C-T PRODUCTS HAVE PROVED DEPENDABLE ON THE WORLD'S DEEPEST WELL . . . THE WORLD'S HIGHEST PRESSURE WELL

XUM



We have reproduced these drawings actual size so you can see **exactly** how big the over-sized "O" Ring seals are in this new O-C-T hanger. The seals cannot flow out under maximum pressures because the extrusion rings conform to the casing.

If the heads you buy do not have this O-C-T Quality, you are not getting the protection and dependability provided by the O-C-T design.

XUM

To get better oil for you...

To bring you the finest products...

To help him earn a good living...

A Standard Oiler works with $41,073 worth of tools

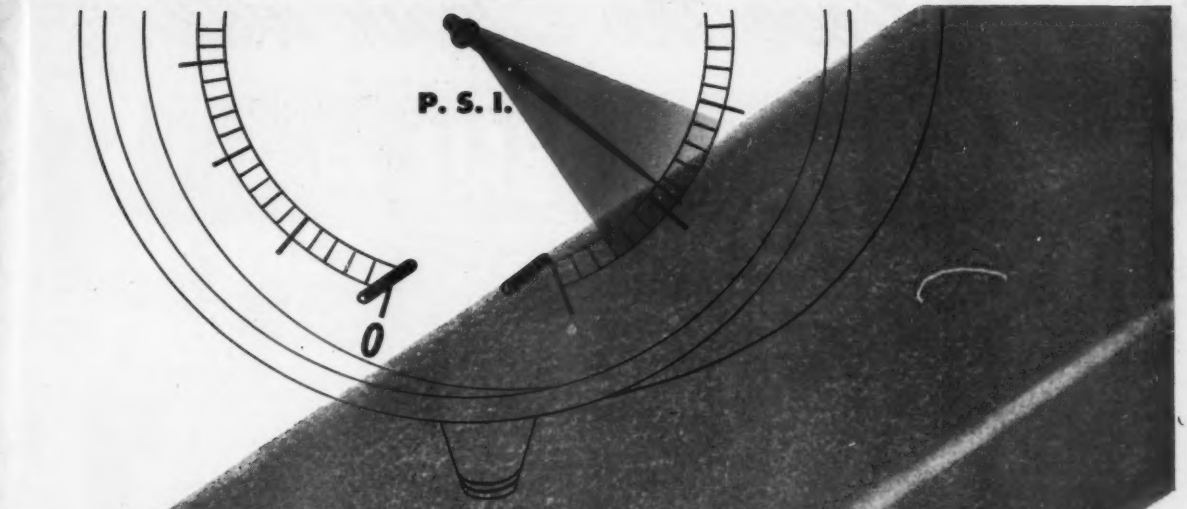
It has long been known that the better a man's tools, the more he can produce and earn.

The farmer with one plow and a horse cannot produce anywhere near as much as today's farmer with a gang plow and a tractor. And today's oilman is a far more efficient producer of good products than ever in history...because he is backed by a tremendous investment in tools.

Every one of the 29,970 employees of Standard of California and our subsidiary companies has behind him $41,073 worth of equipment. With it, he produces more and earns more than ever before—his average income last year was $4083.81 in wages.

It is our responsibility to keep his "kit of tools" in excellent shape and provide more if he needs them. To that end, $450,000,000 has been invested in new plants and facilities since the close of the war.

STANDARD OIL COMPANY
OF CALIFORNIA
plans ahead to serve you better



Where PRESSURE is a factor...

GUN IRON CASTINGS

IF YOU require pressure castings, it will pay you to investigate Gun Iron. First of all, the dense, close-grained micro-structure of Gun Iron is ideally suited to pressure type, leak-proof castings. Added to this, in our foundry you find all the modern controls, equipment and procedures required to assure uniform, porosity-free castings in any size and with the most intricate coring.

These are but two of the important reasons why Hunt-Spiller Gun Iron has been preferred for pressure, wear-resistant and other types of high quality castings for 139 years. To cite one application where pressure is an important factor, Hunt-Spiller produces many of the cylinder heads for leading manufacturers of diesel engines. Frequently, we also finish machine the heads in our manufacturing department to provide complete quality control from furnace to foundry to finished product.

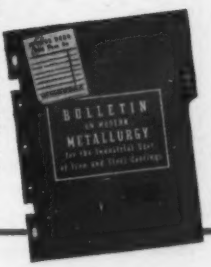
Our engineers stand ready to help you determine the value of Gun Iron and its alloys for your cast parts. Why not investigate right away?

GUN IRON *in the* PETROLEUM INDUSTRY

Hunt-Spiller casts and machines many parts for the petroleum industry. A few are listed below:

LINERS, PISTONS AND RINGS FOR HOT OIL PUMPS • BUBBLE CAPS AND TRAYS • TUBE SUPPORTS • PRESSURE CASTINGS

Chances are that there are many other places where Gun Iron can solve a design or operating problem. To help you determine the value of Gun Iron for your cast parts, our metallurgical department has prepared a comprehensive bulletin which contains complete properties and discussions of Gun Iron and many other metals. Engineers claim it an invaluable reference aid. Send for your free copy today.



HUNT-SPILLER GUN IRON • AIR FURNACE PROCESS •

HUNT • SPILLER

MANUFACTURING CORPORATION

393 DORCHESTER AVENUE • SOUTH BOSTON 27, MASS.

Canadian Representatives: Joseph Robb & Co., Ltd., 4050 Namur St., Montreal 16, P. Q.

XUM

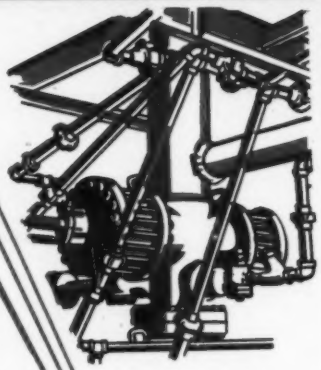
Relieve the Strain with

UNIBOLT FLEXI-BALL JOINTS

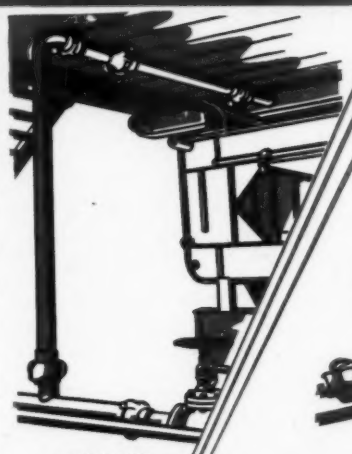
ROTARY HOSE—STANDPIPE END

ROTARY HOSE—SWIVEL END

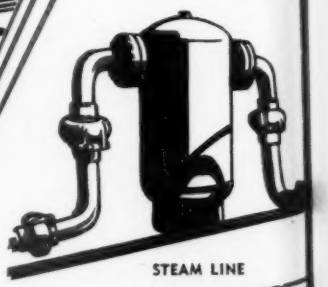
MUD LINES



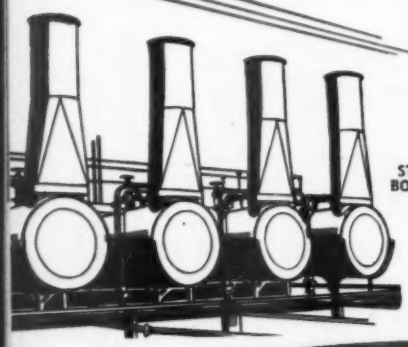
PRESSURE OPERATED BLOWOUT PREVENTER MANIFOLD



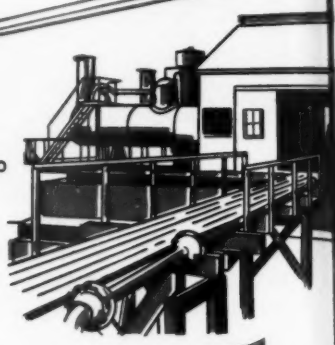
STEAM LINE SUBJECTED TO VIBRATION



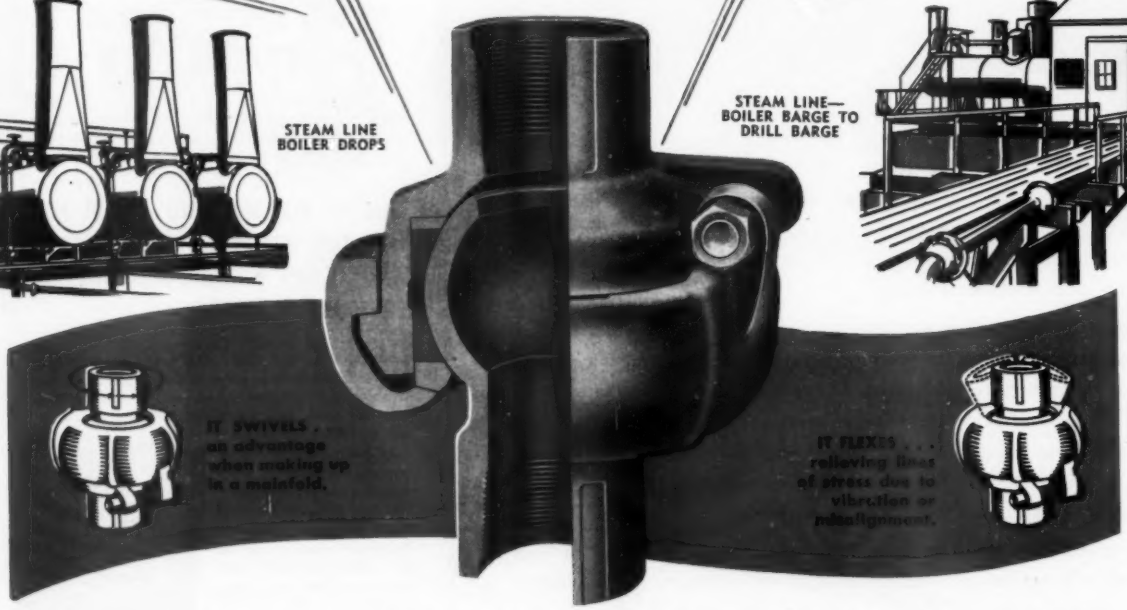
STEAM LINE



STEAM LINE BOILER DROPS



STEAM LINE—BOILER BARGE TO DRILL BARGE


IT SWIVELS . . . an advantage when making up in a manifold.
IT FLEXES . . . relieving lines of stress due to vibration or misalignment.

The Flexi-Ball Joint, which provides for misalignment up to 38 degrees, depending on the size of the joint, is designed to relieve piping of stress caused by expansion, vibration, or misalignment. It is a "natural" for flexible manifolds.

The proven UNIBOLT coupling principle is employed to join the component parts of this fitting. As a result, trouble due to galling and freezing of threads is entirely eliminated by the Flexi-Ball design. It is assembled by the simple process of tightening one bolt with an end wrench. Even after extended periods of service, the joint can be quickly dismantled by releasing the bolt.

This fitting may be used safely in any service, since it is made in steel only. Its sizes range from 1½" to 6" and test pressures to 6000 lbs., depending on size; 500 lbs. steam working pressure.

THORNHILL-CRAVER CO.

HOUSTON, UNIBOLT TEXAS

25 MILES OUT— BUT ONLY *a split-second* FROM SHORE!

2-Way Radio

THE California Company drilling platform and supply ship shown here are far out in the Gulf of Mexico, but rig crews can talk to shore offices instantly—at any time, in any weather. General Electric 2-way radio units on platforms, supply vessels, workers' transport boats and oil barges, as well as at shore points, give this "ocean" oil operation a tight communication net that promotes efficiency, cuts costs.

California—like many another major producer—employs General Electric mobile radio in exploration, land and water drilling, pipeline construction and operation, transportation and refining—wherever instant communication is necessary or delay expensive.

G-E *narrow-band* equipment is particularly suited to the communication needs of the petroleum industry. Call the General Electric office in the city nearest you for full information. Meanwhile, let us send you the booklet shown below. It's worth your attention.

● Write for Bulletin X55-752 on radio communication equipment for the petroleum industry. *General Electric Company, Section 850-11, Electronics Park, Syracuse, N. Y.*

You can put your confidence in—

GENERAL ELECTRIC

DETROIT PUBLIC LIBRARY

Here's a pointer on valves:

buy WALWORTH

No. 726F Iron Body Wedge Gate Valve is only one of Walworth's many styles and types. Everywhere in the production, transportation, refining and distribution, of petroleum products you find Walworth justifying the confidence of the industry.

EVERY WALWORTH VALVE is backed by 106 years of "know-how". The right Walworth Valve always gives you exceptionally good service, whether Gate, Globe, Angle, Check, or Lubricated Plug. For those of you obliged to handle especially troublesome fluids, it will be heartening to know that these dependable valves are available in bronze, iron, steel, and special alloys.

There is never any point in "hunting" for the right valve. For any job a valve is designed to do, your nearby Jones & Laughlin Supply store can flush a whole covey of special Walworth advantages.

79 stores for your convenience!

Jones & Laughlin Supply Company

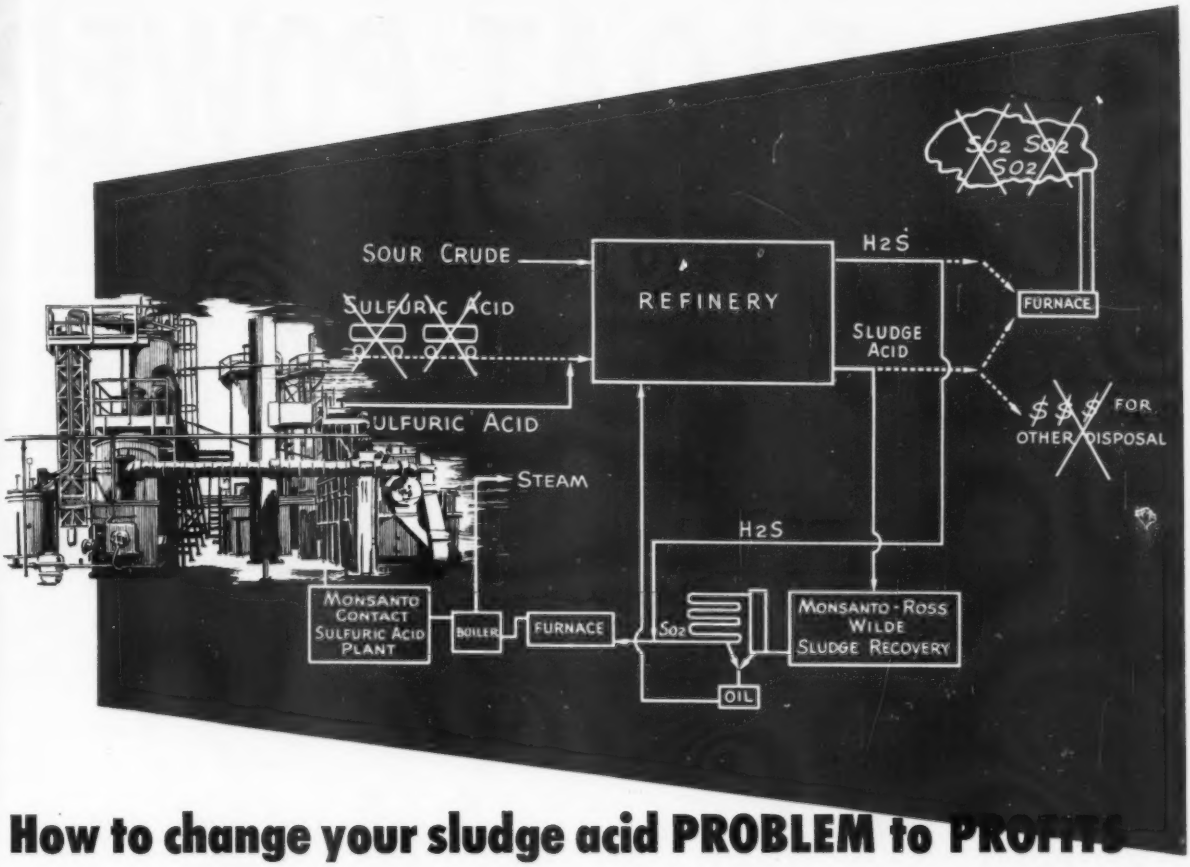
"... here's MY warehouse!"

Subsidiary of
Jones & Laughlin
Steel Corporation

Tulsa, Oklahoma

Export Office: 230 Park Ave., New York 17, N. Y., U. S. A.

J&L STEEL



How to change your sludge acid PROBLEM to PROFITS

If disposal of sludge acid and H_2S is an expensive problem at your refineries, you stand to profit by looking into Monsanto's thoroughly proved process for recovering usable products from these wastes.

Installation of a Monsanto Contact Sulfuric Acid Plant and a Monsanto-Ross Wilde Sludge Recovery Unit *saves* the dollars you now are spending to dispose of sludge acid and H_2S. That's an important economy for many refineries. In addition, you gain better community relations by eliminating pollution of the air and streams.

The Monsanto method not only *saves* dollars, but *earns* dollars. It recovers oil that can be refined into salable products. It produces clean, high-grade sulfuric acid for use in refinery processes. It generates steam that can be used in your operations.

Call in a Monsanto representative and let him tell you how economically you can change your problem into profit. His call will not obligate you or your company. For prompt response, mail the coupon or write: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1745-E South Second Street, St. Louis 4, Mo.

FREE BOOKLET *gives details on sludge acid recovery. Mail the coupon for your copy.*

MONSANTO
CHEMICALS AND PLASTICS

MONSANTO CHEMICAL COMPANY
Organic Chemicals Division
1745-E South Second Street, St. Louis 4, Missouri

Without cost or obligation to my company, please send: .....representative to discuss ways of changing sludge acid and H_2S into dollars. Also, if checked, send .....booklet on sludge acid recovery.

Name.....*Title*.....

Company.....

Street.....

City.....*Zone*....*State*.....

SERVING INDUSTRY . . . WHICH SERVES MANKIND

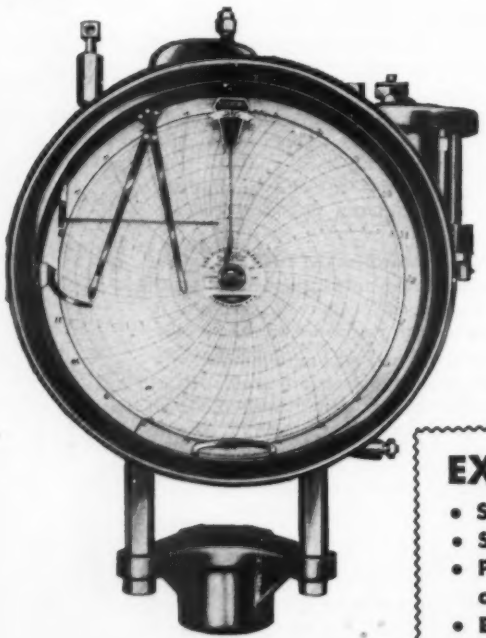
XUM

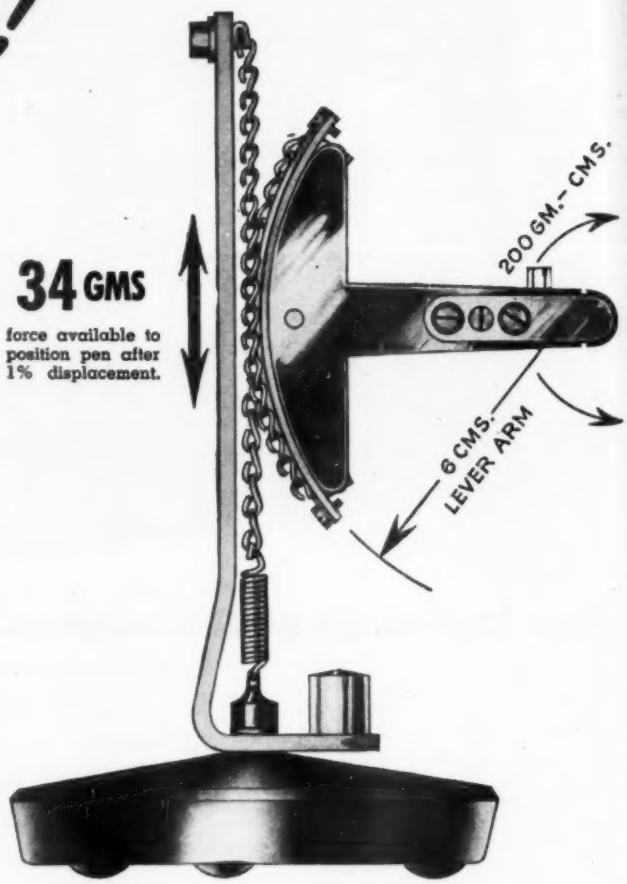
Here's FLOAT POWER *...and no foolin'!*

Driving torque of over 200 gm.-cms. *forces* accuracy in Foxboro Meter Records, despite dirt or scale.

It's typical of Foxboro's *better-engineering-to-the-last-detail* that Foxboro Flow Meters have extra-large floats with extra-long travel. This exclusive feature gives nearly double the power to prevent frictional inaccuracies. For example, in Type 4 and Type 8 Foxboro Meters, it provides pen torque of more than 200 gram-centimeters with a float displacement of only 1% of scale range.

Foxboro Flow Meters cost no more than other meters of the same type. Yet their rugged, better-engineered design means important extra values ... easier installation ... simpler, less-frequent servicing ... positive saving of mercury ... unvarying accuracy throughout years of use.





New Bulletin 200-7 gives detailed information on the extra-value features of Foxboro Meters for all pressures up to 5,000 lbs. Write for your copy. **The Foxboro Company, 60 Neponset Avenue, Foxboro, Mass., U.S.A.** Branches in principal cities.

EXCLUSIVE FOXBORO REFINEMENTS

- **Segmental Lever Transmission gives straight-line calibration.**
- **Sure-Seal Check Valves positively prevent mercury losses.**
- **Pressur-Tite Bearing eliminates friction of stuffing boxes or multiplication for flexure or torque tubes.**
- **Extra-large Float with long travel gives extra power.**

FOXBORO REG. U. S. PAT. OFF. **DIFFERENTIAL-TYPE FLOW METERS**

Open and shut case for TIMKEN® bearings

BECAUSE the stem is mounted on Timken® tapered roller bearings, Powell Pressure Seal Valves are easier to open and close. Related parts work better, last longer. And the high thrust loads on the stem are carried with minimum friction.

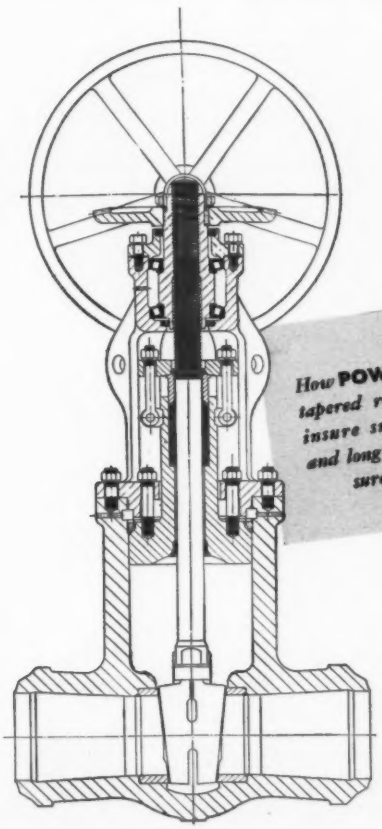
Timken bearings make friction practically negligible, thanks to their true rolling motion and incredibly smooth surface finish. Due to their tapered construction, Timken bearings carry any combination of radial and thrust loads. The line contact between rolls and races gives them tremendous load carrying capacity. Shafts are held in proper alignment, with negligible deflection and end-play. Breakdowns on the job are prevented.

Timken bearings reduce lubrication and maintenance time. They help the closures effectively retain lubricants—keep dust and dirt out.

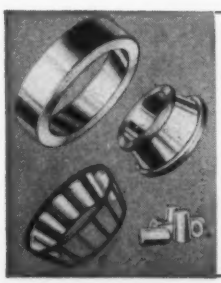
Under normal usage, Timken bearings last the life of the mechanism in which they are used because (1) they are carefully engineered for the job, (2)are made of Timken fine alloy steel, and (3) are precision manufactured.

Over the years, the dependable performance of Timken bearings has made Timken-equipped products first choice throughout industry. When you specify tapered roller bearings for the equipment you build or buy, look for the trade-mark "Timken" on the bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **POWELL** *use Timken tapered roller bearings to insure smooth operation and long life in their Pressure Seal Valves.*



DESIGN LEADERSHIP

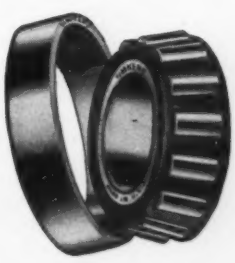
The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roll ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ⬮ AND THRUST →⬮← LOADS OR ANY COMBINATION →✳←

XUM

up goes another Harvey Fractionating Column !

Harvey

This Column, fabricated by Harveys, was lowered into the Thames near their London works, towed across the North Sea, lifted from the water at Pernis, near Rotterdam, and soon became an active part of the Royal Dutch Shell Group's New Oil Refinery. Harveys undertake all forms of heavy constructional work for the Oil and many other Industries.

Send for Catalogue OG 750

G. A. Harvey & Co. (London) Ltd. Woolwich Road, London, S.E.7

XUM

XU

RAYMOND

SERVING GULF OIL FOR 40 YEARS

THROUGH THE YEARS, the Gulf Oil Corporation has called in Raymond again and again to expand its facilities. For example:

At Gulf's marine terminal in Port Arthur, Texas, Raymond completed in 1911 a marginal wharf 25 feet wide and 1053 feet long. Later two similar sections were added to make the wharf more than a half mile long. Last year Raymond resurfaced the existing wharf with reinforced concrete and constructed a new wharf 25 feet wide along its entire face – doubling the deck area and permitting deeper dredging to accommodate large vessels. The job was completed well ahead of schedule and with a minimum of interference with Gulf's normal docking operations.

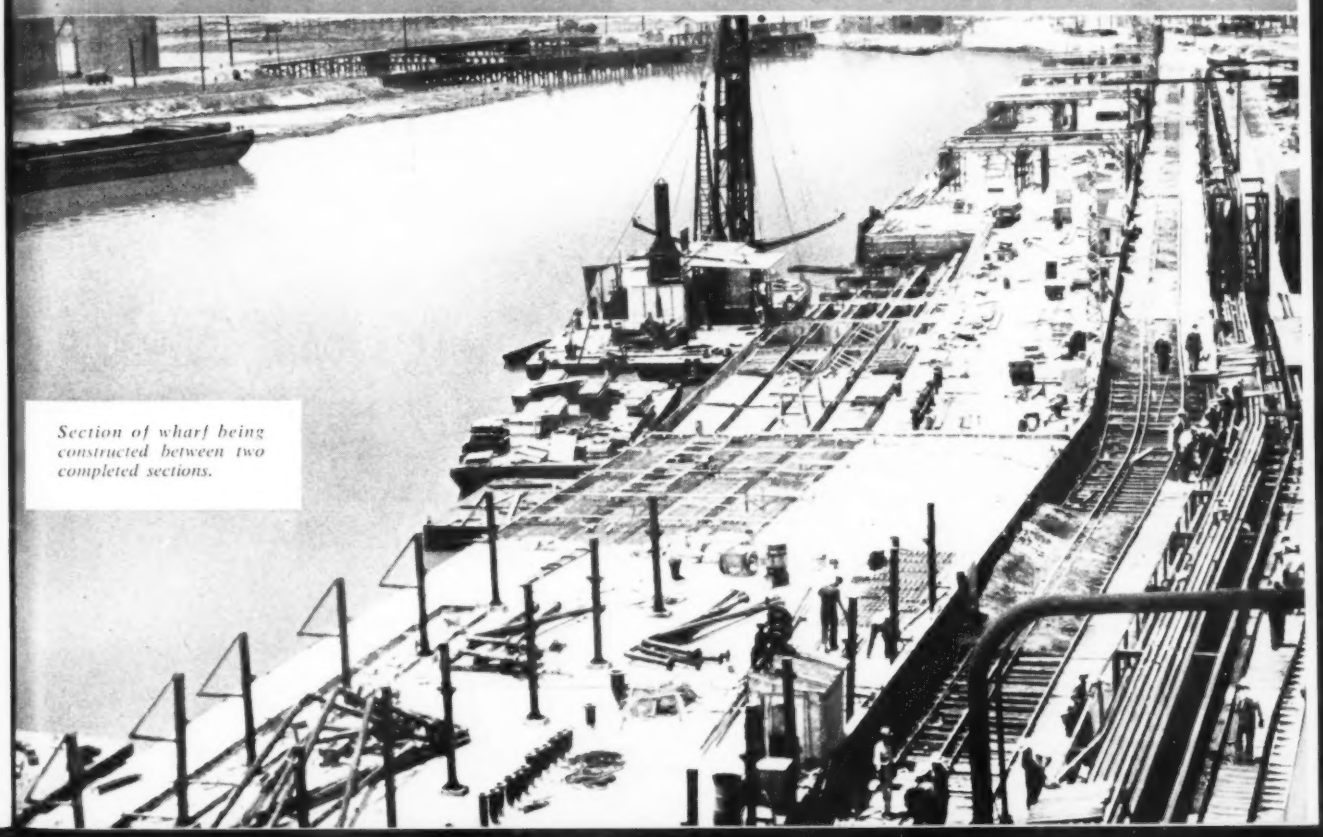
Gulf Oil is one of the leading oil companies which have consistently turned to Raymond for important foundation and structural projects. This wealth of experience is at your disposal.

THE SCOPE OF RAYMOND'S ACTIVITIES—*includes every recognized type of pile foundation—concrete, composite, precast, steel, pipe and wood. Also caissons, underpinning, construction involving shore protection, shipbuilding facilities, harbor and river improvements, borings for soil investigation, and cement mortar lining of pipes by the Centriline Corporation, a Raymond Subsidiary.*

RAYMOND CONCRETE PILE COMPANY

140 CEDAR STREET, NEW YORK 6, N. Y.

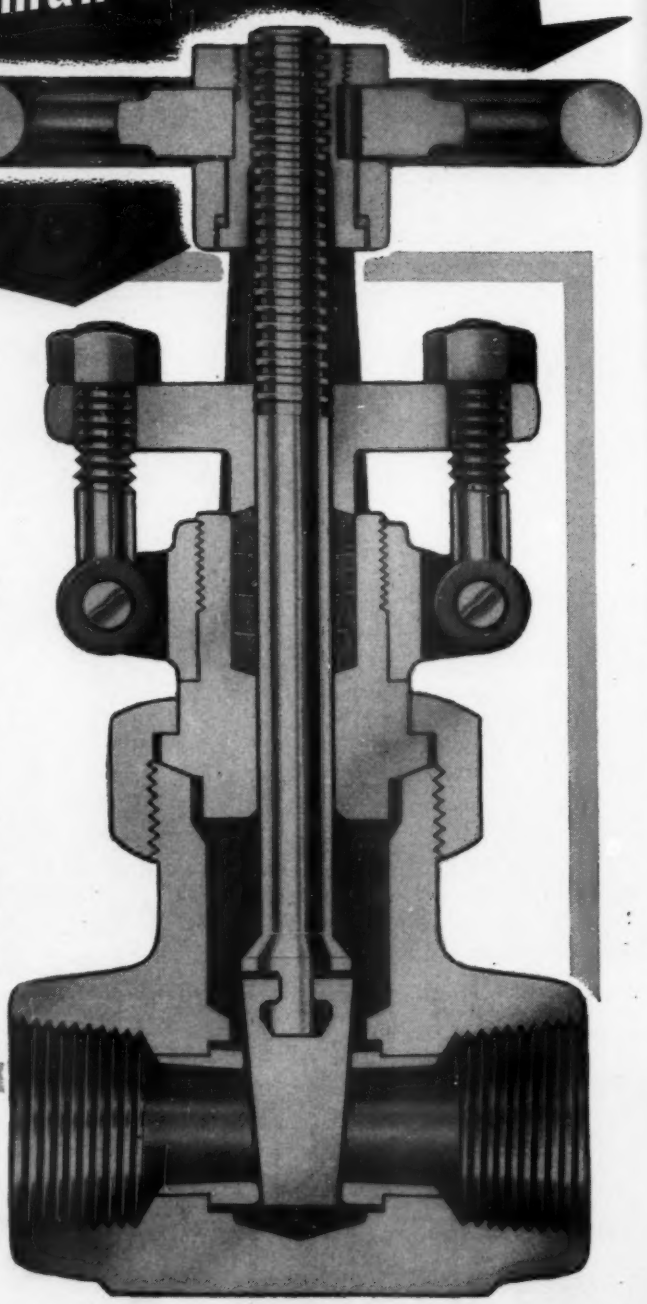
BRANCH OFFICES: Boston, Syracuse, Philadelphia, Baltimore, Washington, Pittsburgh, Atlanta, Miami, Houston, Kansas City, St. Louis, Cleveland, Chicago, Detroit, Salt Lake City, Portland, San Francisco, Oakland, Los Angeles and principal cities in Latin America.



Section of wharf being constructed between two completed sections.

XUM

Here's Why You Get Lower Maintenance Costs with Chapman List 960



1. *Gaskets!*
Available with either metal to metal or gasketed joint as required.

2. *50% Stronger!*
New design features compensate at points where excessive strain can develop . . . make stem and wedge gate connection 50% stronger than before.

3. *Wear-Resisting Wedge Faces!*
To keep your maintenance cost down the wedge faces are hardened to 800 Brinell by the exclusive Malcomizing process.

4. *Replaceable Seat Rings!*
When necessary, you can replace the seat rings easily . . . fast. Seat rings have wear-resisting and non-galling properties . . . made extra hard for years more service.

5. *Full Pressure Repacking!*
No need for costly interruption of flow to repack.

But check this lower maintenance cost for yourself. Next time you buy specify List 960 in sizes from ¼" to 2". Rising stem with yoke (as illustrated) or rising stem inside screw type. For pressure range 2000 lbs. at 100 deg. F., 380 lbs. at 1000 deg. F. Specify List 990 for higher pressures.

The CHAPMAN Valve Manufacturing Company

INDIAN ORCHARD • MASSACHUSETTS

NOW AVAILABLE FOR OPERATORS OF CUMMINS LI-600 DIESELS

Natural Gas-Butane CONVERSION KIT

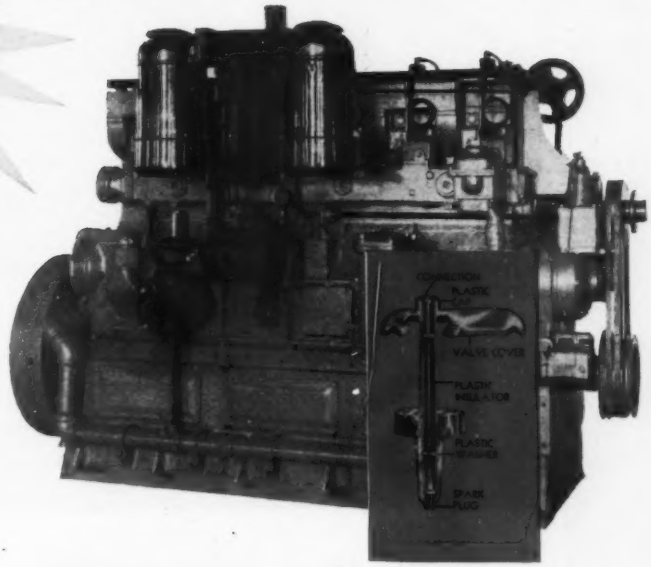
ONLY $1250.00 COMPLETE

"ADAPTER" UNIT FEATURES SIMPLICITY AND LOW COST

Owners of Cummins LI-600 Diesels who find it advantageous to use natural gas or butane fuel because of lower cost or because there is a more readily available supply in the area in which they are operating, can now convert to the desired fuel by using the economical new Cummins Conversion Kit.

In addition to making possible the use of the most convenient and economical fuel, the "adapter" system assures maximum performance from the engine. When operating on natural gas or butane, the engine compression ratio is lowered to 6.8:1 from the 16:1 ratio that applies when diesel fuel is used. This means longer engine life, with an output of 280 horsepower max. when burning 1,000 BTU butane or 78 octane gas.

Ample cooling is provided under all circumstances by use of "Tropical Cores" in the radiators, which were designed for diesel operation. The removeable cores are simple to clean.



Cost of the complete natural gas conversion kit, FOB our shops and not installed, is $1,250. Total cost of the kit plus installation in any of our Nine Factory Type Repair Branches is $1,500. If you desire a field installation, the price is $1,250 plus mechanic's time, expense and mileage. Equipment and installation of butane fuel conversion is an additional $150, installed, in any of our shops. To re-convert for Diesel fuel, the cost is $1,500 in our shops. "Tropical Cores," designed by Perfex Corporation, are available at $440 for a set of eight.

THE LARGEST DISTRIBUTOR OF CUMMINS DIESELS IN THE WORLD

CUMMINS DIESEL POWER

MODERNIZE - ECONOMIZE STANDARDIZE *with* CUMMINS DIESEL GAS-BUTANE ENGINES

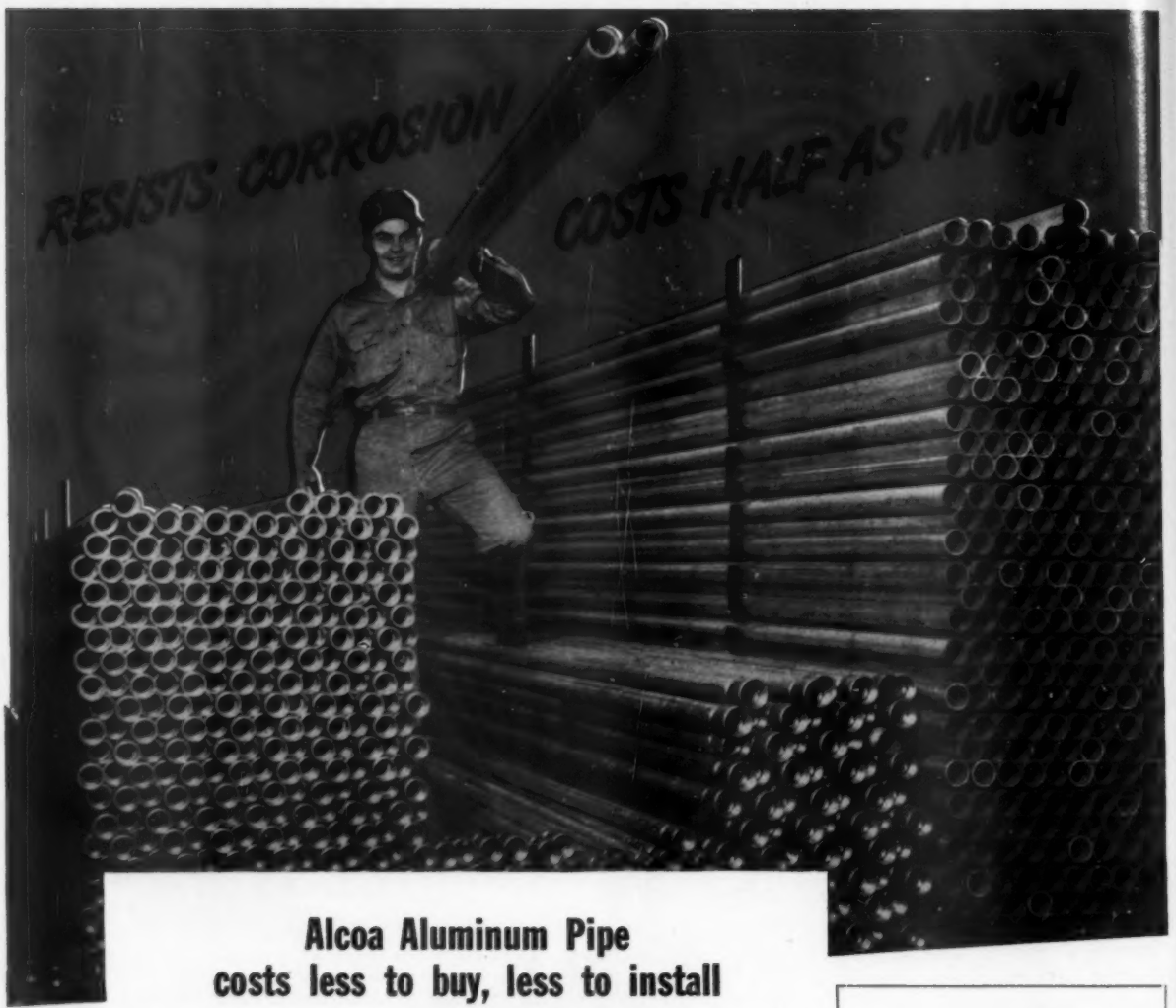
The Cummins Conversion Kit is lower in price than any other now available, and — in addition — is more advanced in design. Write today for Bulletin C200-LG-600.

CUMMINS SALES & SERVICE, INC.

GENERAL OFFICES FORT WORTH, TEXAS

NINE FACTORY TYPE REPAIR BRANCHES WHERE FACTORY EXPERTS GIVE 24 HOUR SERVICE FOR CUMMINS DIESELS

FORT WORTH—HOUSTON—ABILENE—ODESSA—WICHITA FALLS—SHREVEPORT



Alcoa Aluminum Pipe costs less to buy, less to install

You get a two-way saving when you specify strong, corrosion-resistant Alcoa Aluminum Pipe:

You pay as little as half what other corrosion-resistant pipe costs. And you save money on installation, too, because aluminum weighs only one-third as much as heavy-metal pipe. Can be joined easily, using familiar methods, and with standard fittings available from nationally known manufacturers.

Alcoa Aluminum Pipe comes in $\frac{1}{8}''$ to 12″ standard pipe sizes. For your nearest supplier, phone your local Alcoa sales office. Or write ALUMINUM COMPANY OF AMERICA, 1978E Gulf Building, Pittsburgh 19, Pennsylvania.

For Alcoa Aluminum Pipe and other Alcoa products, consult your Classified Telephone Directory under the heading "Aluminum".

FREE BOOKLET gives you the facts on Alcoa Aluminum Pipe—physical and mechanical properties, products for which it is recommended. Write today.

ALCOA ALUMINUM PIPE

INGOT • SHEET & PLATE • SHAPES, ROLLED & EXTRUDED • WIRE • ROD • BAR • TUBING • PIPE • SAND, DIE & PERMANENT MOLD CASTINGS • FORGINGS • IMPACT EXTRUSIONS
ELECTRICAL CONDUCTORS • SCREW MACHINE PRODUCTS • FABRICATED PRODUCTS • FASTENERS • FOIL • ALUMINUM PIGMENTS • MAGNESIUM PRODUCTS

A complete line of
quality petroleum products

Gulf Oil Corporation • Gulf Refining Company

Gulf Building, Pittsburgh, Pa.

Sales Offices — Warehouses

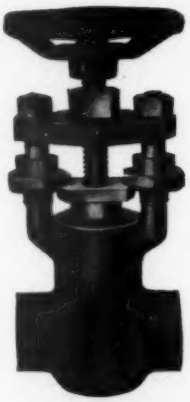
Located in principal cities and towns throughout
Gulf's marketing territory

UNLIMITED SERVICE-LIFE *is just* ONE ADVANTAGE *of*

HANCOCK INTEGRAL STELLITE SEATS

When you install **HANCOCK GATE WELDVALVES...**

you are assured of freedom from valve seat leakage and replacement! For Hancock's integral stellite seats positively prevent leaks between body and seating surface, never need to be renewed! They guarantee valve service-life far beyond requirements of the equipment on which the valves are used.



HANCOCK GATE WELDVALVES *give you these* PLUS FEATURES!

DISSIMILAR MATERIALS In Seats and Wedges mean an extra guarantee of long-life, no galling! Perfect alignment and tightness assured.

SELF-STORING GLAND is a real "plus" for the operator! No wiring, no tying in place and plenty of room and length along the stem to get at the packing.

NO STEM PITTING because stems in all Hancock Gate WELDVALVES are completely coated with a heavy cadmium plating!

YOKE POST and Gland Nut Threads Protected regardless of years of service, corrosive atmospheres! A number of threads on the yoke post studs are always covered, protected, workable.

PACKING EASE because there's plenty of packing space, packing of the highest quality, packing for the widest range of services.

SAFE HANDWHEEL protects the operator in "hot" services!

INTERCHANGEABLE PARTS. All wedges, stems and thread bushings made to exacting uniformity!

CORROSION RESISTANT Back Seating allows stuffing box shut-off around stem when fully opened!

BAKED ENAMEL Exterior Finish means maximum protection from corrosion of all external parts.

You can depend upon your Hancock Distributor for prompt service

MAXWELL MANNING M&M MOORE INC. TRADE MARK

HANCOCK *Valves*

1877 HANCOCK U.S.A.

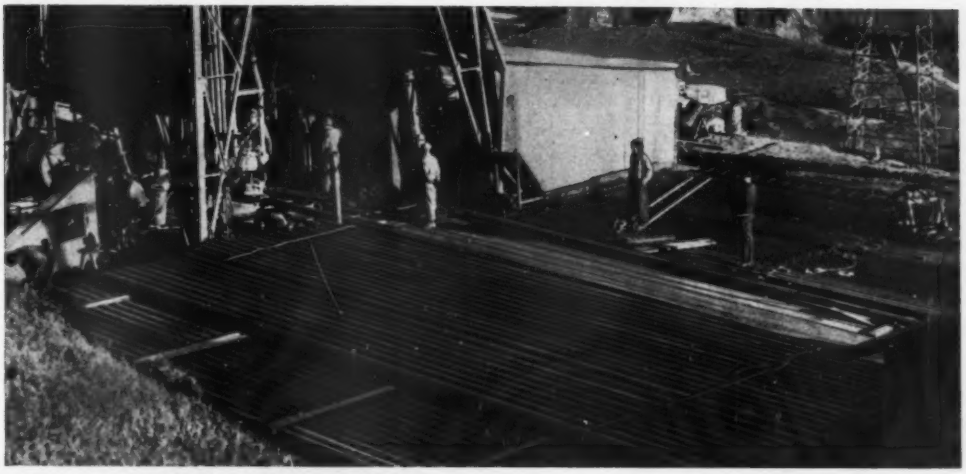
A PRODUCT OF

MANNING, MAXWELL & MOORE, INC.

WATERTOWN 72, MASSACHUSETTS

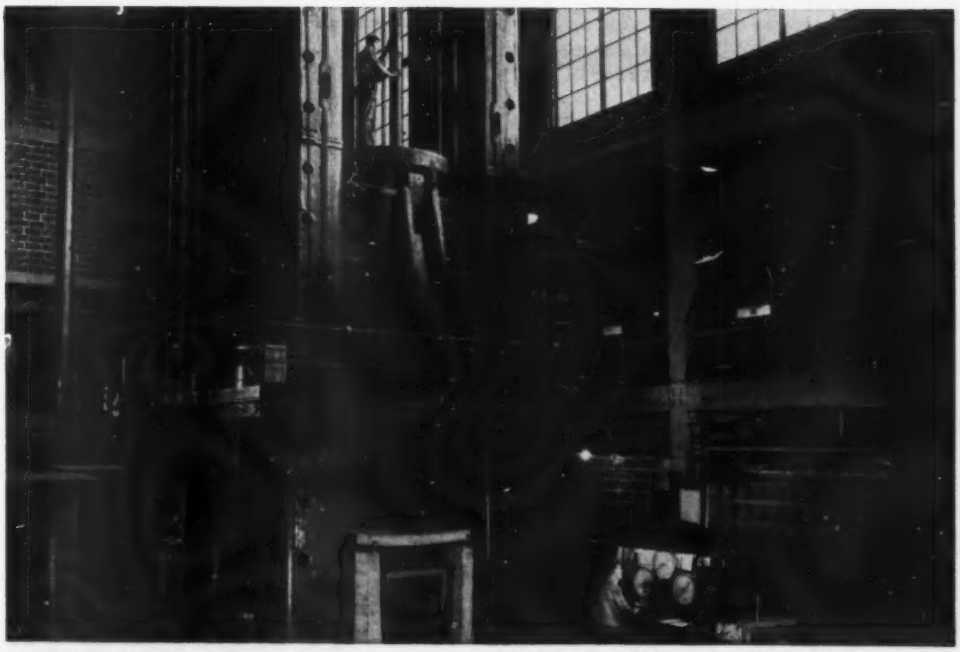
Makers of 'Hancock' Valves, 'Ashcroft' Gauges, 'Consolidated' Safety and Relief Valves, 'American' Industrial and 'Microsen' Electrical Instruments. Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load-Lifter' Hoists and other lifting specialties.

DEPENDABILITY THROUGH



IN A CALIFORNIA FIELD: Running 7400 ft. of 7-inch A.O. Smith Casing.

RESEARCH AND ENGINEERING



IN THE LABORATORY: Pull-out characteristics of A.O. Smith Casing are constantly tested.

76th ANNIVERSARY 1876 1950

A.O.Smith
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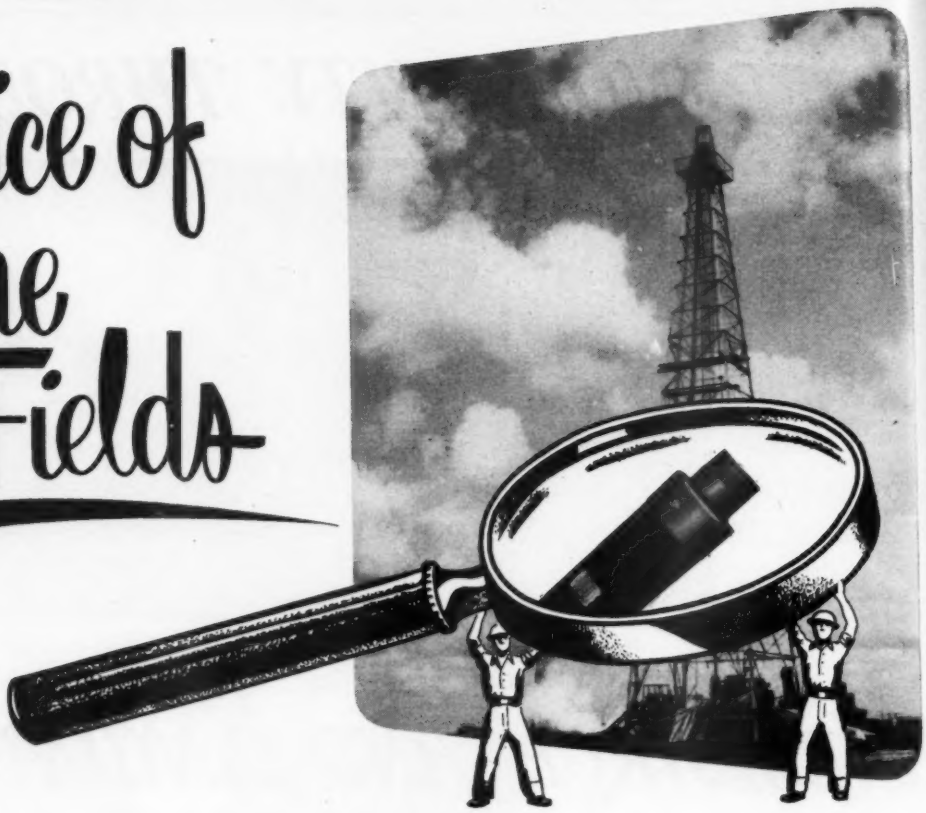

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The shipper "pays the freight."

The more he ships, the more business we do.

That is basic railroad economics.

Every day we are exploring possibilities for the growth of freight traffic, which can build business for the Santa Fe through fair and reasonable transportation charges.

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That is the way it is always going to be. Our general freight traffic officers and Santa Fe freight representatives throughout the United States, are always ready to meet with you on any freight problem.

F. H. Rockwell, *General Freight Traffic Mgr.*
Santa Fe System Lines, Chicago 4, Illinois

Santa Fe—*all the way*

Santa Fe

They Say—

Good-Will Gesture

Sir:

I have just finished reading your "They Say" column in the April 20 edition of your magazine about the inability of Mr. Y. J. Hu, of the Kaohsuing Oil Refinery in Formosa, to continue his subscription to The Oil and Gas Journal because of the impossibility of getting a U. S. dollar check.

Enclosed is my personal check for $3 to cover a year's subscription for Mr. Hu. I'm hoping that this is permissible with you.

Carl Lundquist, Jr.,
Sunray Oil Corp., Duncan, Okla.

Former Reader Hu is being informed of Reader Lundquist's international good-will gesture and the subscription has been entered. Hu's letter was published originally as an interesting commentary on the subscription difficulties of readers in several foreign countries. The Journal wishes to make it clear that it is not soliciting funds for the purpose of providing such foreign subscriptions.—Editor.

Texmass Case

I read with interest your article on Texmass Petroleum Co.'s RFC loan. . . (April 20, page 136). It was, on the whole, an accurate picture of the situation. It did, however, make the same mistake that so many recent stories and articles about the Texmass case have made.

As you probably know, the Texmass case has received considerable attention in the press lately. Most of the "news" about it has issued from the office of the Senate subcommittee investigating the loan. For reasons of its own, the committee has seen fit to issue only those facts about the matter which are favorable to its own anti-RFC point of view. . . .

In all justice, I must say that The Oil and Gas Journal's article is the fairest I have seen yet. Your Washington office has handled the story with admirable impartiality. Nevertheless, certain aspects of the matter were not, for lack of an outspoken Texmass "voice," brought to your Washington office's attention. . . .

Sanford Lee Cooper,
(Texmass public-relations director),
Chevy Chase, Md.

Texmass found its voice a few days later and the Journal's impartial reporter again was on the scene. For data offered by Texmass and RFC in defense of the loan, see The Oil and

Gas Journal, April 27, page 66.—Editor.

Another Imports View

"A cut in imports to the United States is equally a cut in exports from some other country. There is no country exporting oil whose economy is not extraordinarily dependent on a continuation of those exports. If they stop, a good part of the country's income stops and its ability to buy stops correspondingly.

"I doubt that our already heavily burdened taxpayers want to foot any additional bills for assistance to Venezuela or to the Arab countries of the Middle East or, for that matter, for larger Marshall plan budgets."

B. B. Jennings, president, at annual stockholders' meeting. Socony-Vacuum Oil Co., Inc.

Favorite Patient

"The American oil industry seems to be the most appealing target for attack by the politicians. Since wartime controls were removed 4 years ago there has not been a time when some sort of congressional or departmental investigation has not been in progress.

"During much of this time several of these investigations were going on at once—at one period there were 20 bills in Congress proposing various degrees of federal control. Obviously the patient must be possessed of amazing recuperative powers—if it were not it would have died long since of acute diagnosis."

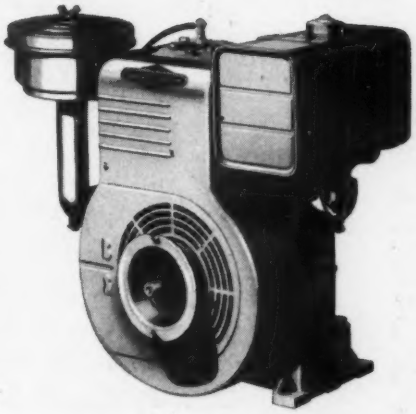
John M. Lovejoy, chairman of the public-relations committee of the American Petroleum Institute, addressing Third Highway Transportation Congress, Washington.

Open to Investigation

"The A.A.P.G. believes that all loyal citizens of the nation, whatever their category, must unite without reservation in support of the measures deemed necessary by the federal authorities for the security and defense of the nation. We believe that no loyal citizen, whether scientist or not, should object to investigation of his loyalty. Therefore, although secrecy may for a time impede our scientific progress, we shall abide by such security requirements. We take pride in our readiness, cheerfully and wholeheartedly, to prove our loyalty and patriotism in case of inquiry."

Resolution adopted by American Association of Petroleum Geologists in protest to the Visscher report of the American Association for the Advancement of Science, which recommended that no basic scientific research done for the Government be kept secret and that no loyalty investigations be instituted against any

Compact... and TOUGH



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Snap-on scores again with a new "Master Supreme" set of four handles, three extensions, a universal joint, and fifteen popular sized sockets. In this ½" sq. drive set you will find highly engineered design, accurate balance, perfect fit, and a comfortable grip, that results in faster, safer, more satisfactory work. Every tool has a full chrome finish for long service life.

Check the features at the left, then ask the Snap-on man to show this set to you. Ask him to demonstrate — try the feel of the tools yourself. You'll agree that mechanics who use dependable tools like these will be a definite asset to your shop.

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scientists in government employ, except those engaged in secret-weapon work.

Effect of High Taxes

"Gasoline is the most heavily taxed basic commodity bought by the public, from whose pockets are also extracted many burdensome taxes on other petroleum products. These are collected from the public by the industry and turned over to the various federal, state, and local governments.

"A multitude of direct taxes, such as real and personal property taxes, federal, state, and local income taxes, severance taxes, taxes upon drilling permits, federal pipe-line taxes, federal import taxes, state petroleum inspection fees, and a host of miscellaneous levies add to the burden. In the aggregate, these taxes profoundly affect the ability of an industry, or a company, to make its full contribution to the general welfare . . .

"No one can view, without deep concern, the unbroken upward spiral of taxation upon all industry and the deadening effect of taxation's heavy hand upon both industrial and individual incentive. There rests upon every citizen, today more than ever before, a duty to do everything within his power to keep government expenditures within the bounds of reason and necessity."

Annual report, Cities Service Co.

Sterling-Dollar Proposal

"Jersey has worked out and submitted to the British proposals designed both to help effect an important dollar saving and to assure continuance of a market for the production of Jersey's foreign affiliates.

"The objectives of these proposals are as follows:

"1. To maintain the company's foreign investments in sound condition, thereby also contributing to the economic well-being of the countries in which the investments are located and to the security of the Atlantic-pact nations.

"2. To decrease the dollar element in Jersey's cost of oil production and thus reduce the dollar deficit of the sterling area.

"3. To maintain that volume of the company's foreign markets which it would obtain by normal commercial competition in the absence of preferential trade and exchange controls by government.

"Jersey has demonstrated, both through the steps taken and the measures proposed, its recognition of the British need to save dollars. But the company believes that steps which concentrate exclusively on the immediate saving of dollars may, in attempting to solve today's problems, only create greater problems for tomorrow."

The Lamp, Standard Oil Co. (N.J.).

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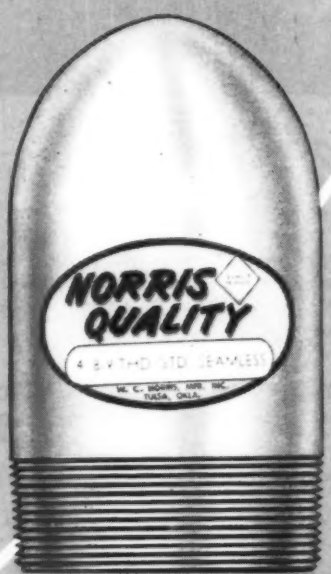

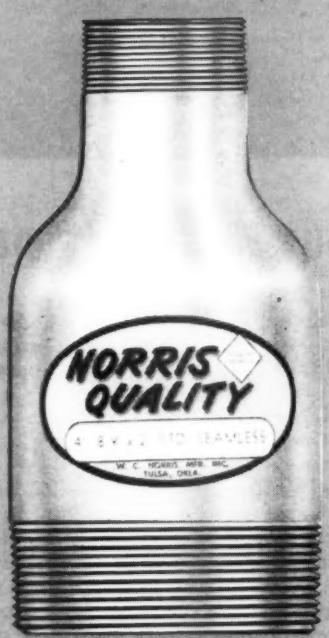

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JOURNALLY Speaking

Success Story

ONE of the delights of reading the popular magazines on mechanics and science is the advertisements relating how people became successes by means of the proffered correspondence courses. You've seen the catch-lines—"They laughed when I sat down to play," or "Don't envy a plumber—be one."

Now we can tell one ourselves. For more than a year this publication carried every week a page of very dry-looking tables under the heading "Cost-imating" by W. L. Nelson, technical editor. It was designed to be clipped and filed by refinery engineers, who were promised that when the series was completed it would give them a short-cut method for computing the cost of new construction.

Maybe we should have had a blurb: "Big money in designing refineries. Learn at home. Turn your spare time into cash."

But our astute refinery readers didn't need such a blurb. Quite a few of them clipped the series, used it to their profit, and told us about it. Here is a typical "success story" from our files:

"By sheer coincidence, shortly after the series was published I was requested to submit a 'percentage completed' analysis of the refinery we are building. I am happy to advise you that with the aid of the 'Cost-imating' series my estimate rated closest to that of our vice president."

It's not too late to get in on this deal, and it will cost you only one dollar. That's the price our Reader Service Department has put on the reprint of the series, just off the press in booklet form.

Music, Music, Music

IT has often seemed to us that oil men were less given to song than sailors, cowboys, lumberjacks, and other crafts, but every now and then something turns up to indicate that we may be wrong.

Item: Standard Oil Co. (Ind.) is very proud of the fact that John E. O'Keefe, a boilermaker in its Whiting refinery, has written words and music to "There's a Wee Bit of Heav'n in Your Eyes," which is getting something of a play on the radio. Pretty good for a refinery man. It encouraged John so that he has started to study music.

Item: Gov. Roy J. Turner, of Oklahoma, who is also an independent producer, has written words and music to "The Old Well Digger" who aimed to be a millionaire from every hole he dug but is still "a-pluggin' and a-riggin', a-chuggin' and a-diggin' for oil." Pretty good for a governor. It may encourage Roy to go back to the oil business when his term expires.

Exit Churn

THE dairy industry, we hear, is in need of a method for continuous production of butter in order to get away from the batch method of churning. Since butter-making is essentially nothing more than breaking an emulsion, which is old stuff to the oil industry, some of our good advertisers might work up a little side business selling emulsion breakers to creameries.

Batting Average

OUR refinery editor, George Weber, has been writing quite a bit of late about possible improvements in automobile engines which would permit the use of lower grades of fuel. But he always includes a warning that a lot of the ideas which look fine in theory may not work out in practice.

Substantiation of that conservatism comes from the Automobile Manufacturers Association, which recently confessed that of all the ideas for car improvement tested by the industry's experimenters, "at least four out of every five projects end in failure."

This is no better than the oil industry's record of wildcat successes. Last year, for example, 82 out of every 100 wildcats ended in failure, although each one seemed like a good idea at the time it was spudded.

Considering the supposed exactness of mechanical sciences as against the vagaries of Mother Earth, these comparative batting averages make petroleum engineering look pretty good.

—Henry D. Ralph

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Buying?

If you need to buy stocks of Butane-Propane, Natural Gasoline, Diesel Oil, Fuel Oil, Naphtha, Kerosene or other Petroleum Products, call Anchor First. Anchor sells nothing but the finest petroleum products. And, since Anchor deals wholesale only, they're never your competitor. "Small enough to know you, large enough to serve you." . . . That's Anchor. Call Anchor First and make a pleasant and profitable deal.

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If you sell Butane-Propane, Natural Gasoline, Diesel Oil, Fuel Oil, Naphtha, Kerosene and other Petroleum Products, call Anchor to relieve you of your marketing problems. Anchor, one of the Nation's largest independent marketers of LFG, buys your high grade petroleum products. So take the "marketing load" off your shoulders and call Anchor first when you have petroleum products to sell.

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VOL. 49, NO. 1 MAY 11, 1950

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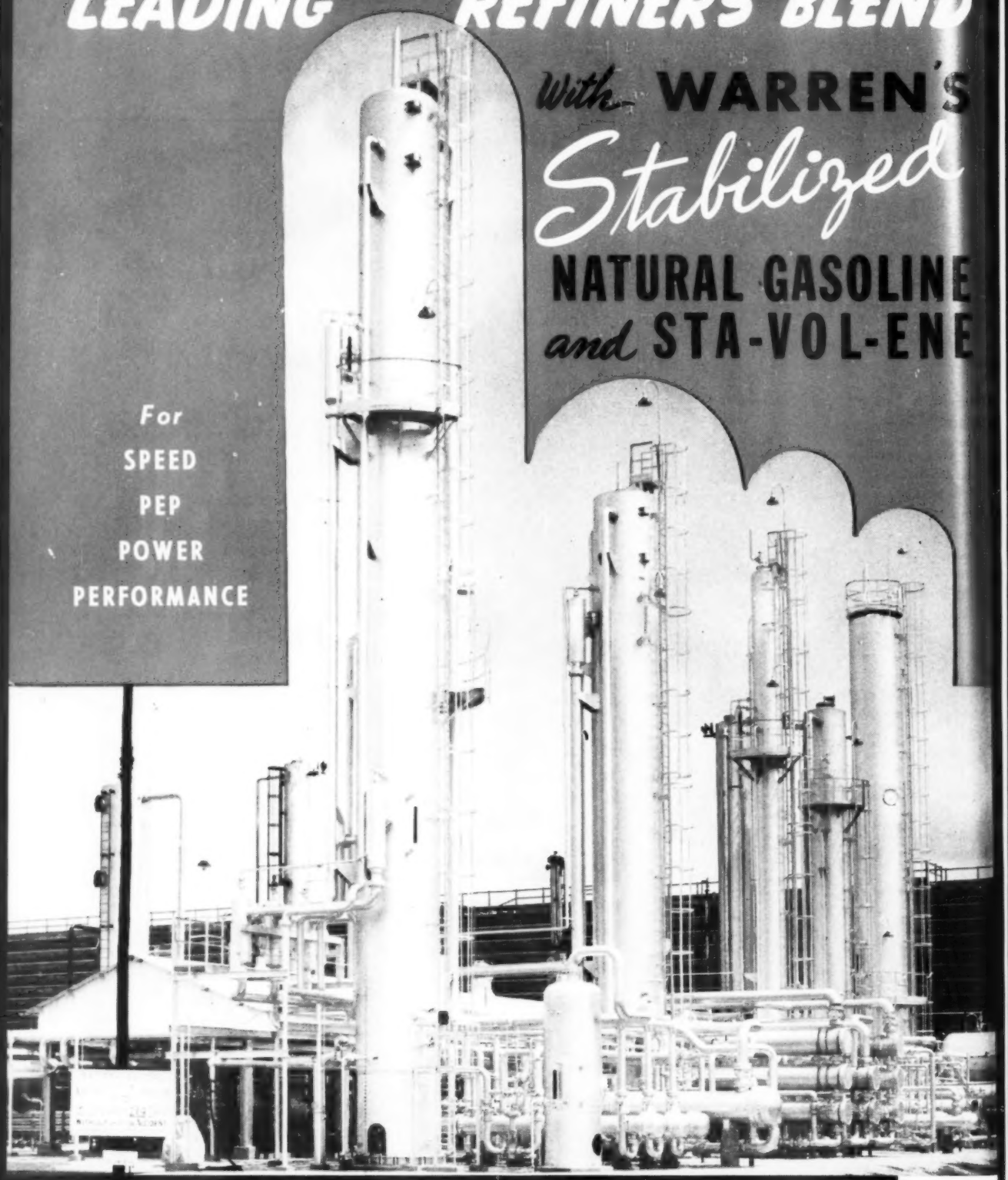

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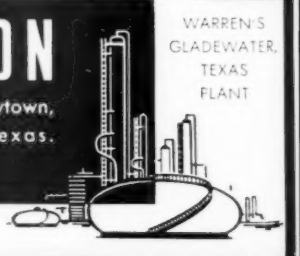
Texas City, and Norsworthy, Houston, Texas.

TULSA 2, OKLAHOMA CABLE ADDRESSES: Stavolene, Warren



WARREN'S
GLADEWATER,
TEXAS
PLANT

Crude Oil, Natural Gasoline and Liquefied Petroleum Products

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Threefold Responsibility

As we perused the last of the 1949 annual statements we have been impressed with the accuracy of the observation of an outside analyst who wrote that "the oil companies have come a long way in presenting comprehensive annual reports covering their activities."

Explaining the operations of an oil company engaged in all divisions of the petroleum industry from exploration to service stations so that hundreds of thousands of stockholders, with little or no oil background, can understand them is not an easy assignment. But it has been done.

Additional companies this year also made their statements available to all employes, stressing operating data of particular importance to them. In some cases specially prepared booklets were sent to employes or the annual information was presented in summary form in employe publications.

The importance of this from the standpoint of sound industrial relations cannot be overemphasized. The oil business continues to lead or equal all other major industries in wages, pensions, insurance, vacations, and in accident, health, and other benefits for employes. Labor leadership too often is prone to overlook or minimize the importance of this accomplishment.

In this connection we commend those managements who have felt it their duty to point out to stockholders and employes that they, too, have responsibilities to their companies and that there are trends in our economic life and in Government which are a threat to the continuance of their favorable positions.

Outstanding in this regard are the constantly mounting taxes. Payments last year by the oil business exceeded 3 billion dollars. Thus for every barrel of crude oil produced, taxes totaled approximately $1.50.

In the case of one typical company the payments to the taxing agencies totaled $4,494 for each employe and $17.50 for each share of common stock. Another company pointed out that 17.2 cents from every dollar received from customers went for taxes.

Company officials are doing all they can to end this continuing trend which, if not checked, will lead to financial and then operating disaster. But this is a threefold responsibility of management, employes, and stockholders, with no essential differences in the stakes involved.

Soconoy-Vacuum's Holton, speaking to stockholders at the annual meeting of the company, reflected the concern of management everywhere when he said: "Together with our employes, we are all partners in this venture.... I have in mind particularly your responsibilities in connection with that remaining and not-so-silent partner of ours, the Government, which makes its own definition of what are profits, then seizes half of our real earnings. There are certain elements in the Government in Washington whose practices and philosophy constitute in my opinion the greatest peril facing American industry from within or without the country."

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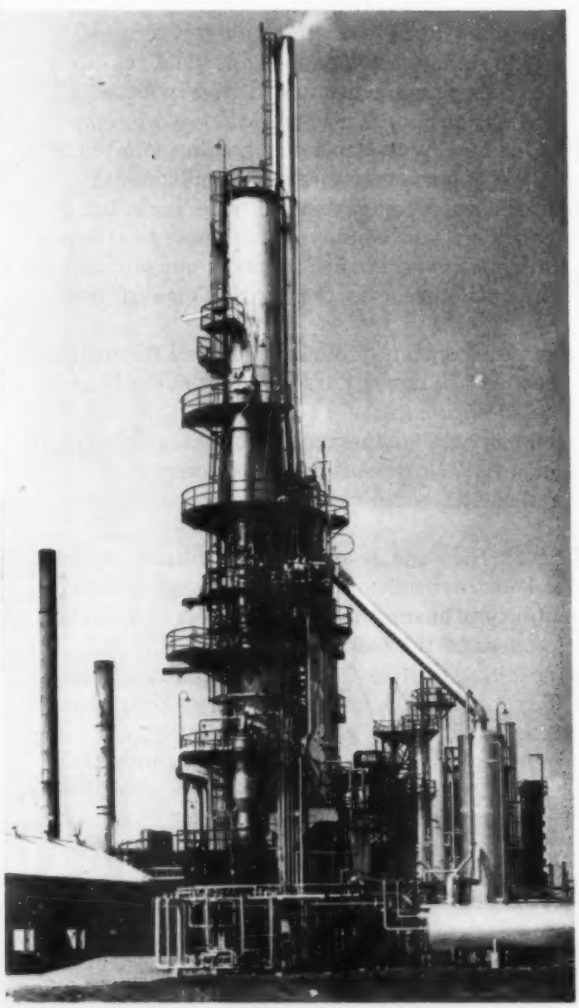
THIS WEEK

RECORD—Oil-industry earnings and operations last year were the second highest on record, dropping from 1948. . . . Survey of 32 companies shows general decline in earnings but increase in assets and continued high capital expenditures. . . . Operating revenues were decreased by reducing crude production and lower products prices. . . .

INTERNATIONAL—Discovery of nine new producing areas made 1949 the best oil year in Germany's history. . . . Location of anticlines and stratigraphic traps may mark new era in its oil industry. . . . ¶Negotiated settlement gives Iraq Petroleum Co. offshore oil rights in Qatar territorial waters, Superior Oil Co. rights on Continental Shelf. . . . ¶Doubt raised on validity of Tapline's concession in Syria, though some pipe already laid. . . . ¶Oil shows reported in wildcat in new area of eastern India. . . .

WEST COAST—Nevada will get first real oil test this year. . . . Continental-Socal wildcat in northeastern part of state will go to 7,500 ft. . . . Other major companies doing field exploration work. . . . ¶Town-lot area in Long Beach may be developed by directional drilling if city ordinance is amended. . . .



ACTIVITY—Crude production for the week ended May 6 averaged 5,002,900 bbl. daily, an increase of 59,875 bbl. daily over the previous week and 92,600 bbl. daily over the same week last year. . . . Total completions dropped 20 wells for the week to 766. . . . Wildcat completions, at 134 wells, remained the same as previous week. . . . Rotary rigs operating in United States on May 1 totaled 2,049, off 9 rigs from a week earlier. . . .

TRENDS—Production of crude and field condensate in April is estimated at 5,010,000 bbl. daily, about the same as last year. . . . Refinery runs of domestic crude were 20,000 bbl. daily greater than in April a year ago and runs of foreign crude increased about 65,000 bbl. daily. . . . Major product stocks decreased at the rate of about 370,000 bbl. daily in April compared with an increase of 98,000 bbl. daily in same month last year. . . .

GOVERNMENT—RFC defends its entry into oil financing. . . . Says Texmass loan sound. . . . Truman proposes liberalized lending authority for RFC which may pave way for further oil loans. . . . ¶Oil and Gas Division may be cut off from all appropriations. . . .

PIPE LINES—Transcontinental Gas Pipe Line Corp. spokesman tells FPC it is willing and able to supply natural-gas requirements of all applicants along its main line. . . . ¶Latex Construction Co. completes 25-mile, 16-in. section for Tennessee Gas Transmission Co. from Kinder to Grand Chenier, La. . . . ¶Texas Eastern Transmission Corp. files amended application with FPC seeking permit to construct 791-mile, 30-in. line to serve New England area. . . . Estimated cost of the project is $117,800,000. . . .

REFINING—New modified Thermofor catalytic cracking units being installed in nine domestic and one foreign refinery. . . . Socony-Vacuum development utilizes air lift for catalyst. . . . New units mostly replace old fixed-bed installations. . . . ¶Pocahontas Calso to build new oil terminal in South Portland, Me. . . . ¶Navy Department lets contracts for purchase of aviation gasoline and JP-1 aviation fuel. . . . ¶Strike still continues at Quaker State Refining Co. plants, although 35 workers return to Emlenton plant. . . .

IMPORTS—March figures show gain in imports following drop in February. . . . High current rates attacked by Interstate Oil Compact Commission at Biloxi meeting and by Independent Petroleum Association of America in Los Angeles. . . .

NEW WRINKLES.—Latest in small catalytic cracking units is this one incorporated into the processing layout of Panhandle Producing & Refining Co. at Wichita Falls, Tex. This new fluid unit is set up to catalytically crack 1,500 bbl. of stock daily and is the latest of its type to go on stream. The unit was designed by Universal Oil Products Co. and erected by Jones & Laughlin Supply Co. An article describing another refining development, the new modified Thermofor catalytic cracking process, may be found in this issue on page 53.

Compact Views Imports

Commission thanks House group for conducting hearings on question, asks federal action to reduce imports rate

Henry D. Ralph

BILOXI, Miss.—The effect of imports on the administration of state conservation laws was the chief topic of discussion at the spring meeting of the Interstate Oil Compact Commission here May 4-6.

Imported oil was the subject of two resolutions adopted, it was mentioned in several of the formal addresses, and it clearly dominated the informal discussions.

Imports keynote.—The official theme of the meeting was "Conservation and the Public Interest," and the keynote of this theme was set in the featured address of Robert B. Anderson, president of the Texas Mid-Continent Oil and Gas Association. But Anderson's greatest applause came when he discussed imports in these words:

"In the maintenance of economic stability within the domestic industry and in order to insure a continuity of production levels and an advantageous rate of exploration and discovery of new reserves, consideration must be given realistically and unafraid to the problem of petroleum imports.

"Failing in this, we expose our conservation agencies to the necessity of so limiting production and regulating production practices as to make impossible the protection of individual correlative rights.

"In the interest of international recovery and the development of a democratic world, we must seek a level of imports and exports that will achieve the necessities of foreign trade and exchange and at the same time not impose crippling limitations upon an industry, the vitality of which is essential to our national welfare and defense.

"It should be our concern here that the problem is approached by independent intelligence and with the cooperation of state regulatory bodies in the development of the true facts and their effect on the domestic oil supply. Surely we who are so quick to defend and so anxious to maintain a system of free enterprise and state sovereignty, can through the application of intellectual integrity and wise action find a solution to this problem without seeking the action of Congress which may well expand itself into mandatory federal control."

The question of imports came up during one of the open forums when Ernest O. Thompson, member of the Texas Railroad Commission, announced that the presidents of most of the large importing companies have agreed to appear before that body in Austin May 17 to reveal their plans for importing crude and products during the remainder of 1950. Thompson said that at this hearing the commission hopes to obtain data which will permit it to determine the market demand for domestic and particularly Texas crude.

The Compact Commission voted to ask the Texas body to send a summary of this hearing to all state regulatory bodies and also to the congressional committees which have been studying the subject of oil imports.

R. M. Wagstaff of the West Central Texas Oil and Gas Association, Abilene, asserted that the import problem is serious because allowables have been reduced to the point where payout on oil properties is so slow that bankers are refusing to make loans for exploration and development. Because market demand, he said, is now being determined by about five importing companies, Wagstaff asked that the next meeting of the compact be devoted to the theme: "Imports and Conservation." This request, however, was not acted upon.

Resolutions.—Two resolutions pertaining to imports were adopted. One thanked the House small-business committee for its series of hearings on the effects of oil imports.

The other called on this committee to speed federal action on "such measures as are needed to reduce oil imports to a more reasonable figure than that current today," and also to require the importing companies to make known their firm estimates of imports for the remainder of this year.

Market-demand prorations.—The importance of basing proration on market demand was a secondary unofficial topic of the compact meeting. This was the subject of an exhaustive report presented by Harold B. Fell, executive vice president of the Independent Petroleum Association of America, which was discussed by several of the compact's committees.

Explaining that he was writing as a petroleum engineer and independent producer rather than as a lawyer, Fell undertook to answer attacks on market-demand statutes by explaining in layman's language the ways in which physical waste is prevented by prorating oil production to current demands of the market. He cited the histories of many fields in proof, and quoted figures to show that this method of proration has never resulted in a tight supply or high prices of petroleum products.

This same theme was stressed by Gov. Roy J. Turner of Oklahoma in his report as chairman of the compact, and again by R. B. Anderson in his address.

Highlights.—Among the other highlights of the Biloxi meeting were these:

Gov. Fielding L. Wright of Mississippi, in welcoming the commission, declared that under the conservation law enacted 2 years ago Mississippi is making rapid progress in developing its oil industry and now has 1,552 producing wells in 35 fields and 131 wildcat wells scheduled for this year.

Gov. John W. Bonner of Montana reported that his state is experiencing an oil boom, with 33 oil and gas fields, 9,500,000 acres of land under oil lease, and 90,000 sq. miles considered to be good prospecting territory.

A booklet listing all unitized and cooperative producing projects in the United States was presented to the compact by its research and coordinating committee, and made available for general distribution.

The subject of well spacing was discussed at length by the research and coordinating committee after hearing a report on the subject by H. H. Kaveler of Phillips Petroleum Co., Bartlesville *(see The Oil and Gas Journal, April 20, 1950, page 208)*. It reported that it has concluded that drilling regulations based on spacing alone are inadequate and that it hopes to have policy suggestions at the next compact meeting.

Adoption by all state and federal agencies of a uniform measurement for natural gas, based on a pressure of 14.65 psia. and a temperature of 60° F., was endorsed by the regulatory practices committee, but the matter was referred to the engineering committee for study of practical obstacles.

A final draft of a proposed model state conservation statute was completed by the legal committee. This draft met objections raised by some states to an earlier draft which called for determination of a monthly allowable for the entire state and then dividing it among pools. Under the approved draft, each pool is to be given an allowable based on its individual conditions and the total is then to become the state allowable.

The engineering committee announced completion of the text of a handbook on conservation engineering, which will be published as soon

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as suitable illustrations are assembled.

The committee on secondary recovery submitted reports on projects in operation in Kansas and Arkansas in 1950, and asked the American Petroleum Institute to make separate estimates of crude reserves of the various states which could be recovered by secondary methods.

Thad J. Dorsey of Atlantic Refining Co., Dallas, reported on his company's new method for producing oil by injection of gas at very high pressures *(The Oil and Gas Journal, April 6, 1950, page 78)*. Because this method promises more complete recovery, under certain conditions, than is possible by methods now in use, the Atlantic company was invited to make a more complete report to the compact some time in the future.

James L. Elder of the U. S. Bureau of Mines described the Gorgas, Ala., experiment in underground gasification of coal, and declared that this method gives promise of utilizing coal resources now uneconomic to mine.

Chairman's report.—In his report as chairman, Governor Turner declared that the conservation laws of the Compact states can claim credit for the present favorable conditions in the petroleum industry, saying:

"The oil industry today is in one of the healthiest conditions that it has enjoyed for many years. There was great concern during 1949 about the mounting stocks. However, the action of the states upon their sovereign state authority has cured this situation."

Turner said that the problem has been made much more difficult by high imports of foreign oil which has cut deeply into the revenues of the states which curtailed production to avoid waste. But he added that this was accomplished without disaster to the oil industry.

He pointed out that new discoveries such as those in Kent and Scurry counties in Texas, have been given allowables which have been fitted into the national picture, thus avoiding disastrous overproduction and price declines such as followed big discoveries prior to the general adoption of state conservation laws. These state laws, he said, should be given credit for the increasing underground reserves of the nation, and for producing practices which now make it possible to recover a much higher percentage of the crude than was usual before these laws were in effect.

This theme was developed in more detail in Anderson's address, in which he called conservation the insurance against ghost towns and empty fuel tanks.

The individual genius and enterprise which have characterized the oil industry are not enough, Anderson said, and the state conservation laws have provided the steadying influence which has made the supply of oil stable and dependable. Because of these laws, farmers, industries, and individuals purchase automotive equipment with full confidence that they will have an adequate supply of fuel at stable and reasonable prices for many years, Anderson said, and this is the highest tribute to the effectiveness of conservation.

Also, the people who live in the oil-producing areas do not want to tie their economy to the boom-and-bust developments such as were experienced prior to the enactment of state conservation statutes, he added.

"The promise of a rightful share of the petroleum market upon discovery of oil has stimulated thousands of oil and gas operators of limited financial means in their search for oil," he said. "This promise by conservation authorities has never been broken.

"The steady, orderly method of production of those properties has provided these small operators with the type of collateral that will be acceptable for additional financial assistance which is so necessary for continued search and development.

"Thus the very financial foundation of the search for and development of oil and gas is closely linked with the conservation practices and laws of the oil country. Only the most short-sighted and wholly uninformed could fail to see the need for this continued search and development."

Imports Up

Increase in residual fuel oil is major factor in gain

IMPORTS of crude and products into continental United States during the month of March averaged 879,000 bbl. daily, according to data of the Department of Commerce. This is only 8,000 bbl. daily less than the all-time record set in January of this year.

Crude imports averaged 481,000 bbl. daily in March compared with 425,000 bbl. daily in February and 534,000 bbl. daily in the record-setting month of January. Crude from Venezuela totaled 9,634,000 bbl. for the month, an increase of 2,290,000 bbl. over February but still 1,221,000 less than in January. Total crude from Middle East was about the same as March of last year but 684,000 bbl. less than in January of this year.

The major factor in the increase for the month was the gain in imports of heavy fuel. Residual imports averaged 374,000 bbl. daily and accounted for 42.6 per cent of total petroleum imports.

Total exports, excluding shipments to territories, averaged 233,000 bbl. daily, compared with 303,000 bbl. daily in March of last year. Most of the decrease resulted from a decline in shipments of gasoline and distillate fuels.

IMPORTS INTO CONTINENTAL UNITED STATES
(Thousands of barrels)

	Mar. 1950	Feb. 1950	Mar. 1949
Crude—			
Mexico	889	585	620
Colombia	1,587	1,176	1,072
Venezuela	9,634	7,344	6,936
Iran	.....	.....	113
Kuwait	1,506	1,983	1,530
Saudi Arabia	1,308	687	1,254
Other	.....	116	.....
Total crude	14,924	11,891	11,554
Daily average	481	425	373
Products—			
Residual fuel	11,606	7,087	4,939
Other products	726	575	168
Total products	12,332	7,662	5,107
Daily average	398	273	165
Total all oils	27,256	19,553	16,661
Daily average	879	698	538

EXPORTS*
(Thousands of barrels)

	Mar. 1950	Feb. 1950	Mar. 1949
Crude—			
Crude	2,153	2,196	1,966
Gasoline	1,212	1,390	3,526
Distillate	950	1,028	1,326
Lube oils	1,123	1,149	1,136
Other products	1,795	1,116	1,548
Total all oils	7,233	6,879	9,402
Daily average	233	246	303

*Excludes shipments to territories.

Big Project

FPC approves Trunkline, Panhandle Eastern plans

WASHINGTON. — Construction of 1,648 miles of natural-gas pipe lines at an estimated cost of $110,249,500 has been approved by the Federal Power Commission.

The two companies involved were directed to begin construction by June 30.

Included in the decision are the following programs:

Trunkline Gas Supply Co., authorized to construct a 740-mile 26-in. Louisiana-to-Illinois main-transmission line, and 560 miles of laterals.

Panhandle Eastern Pipe Line Co., authorized to construct 160 miles of line and install new compressors as additions to its present system. Also, 188 miles of line previously authorized by FPC will be built in conjunction with the new Panhandle Eastern expansion program.

Trunkline's project.—Trunkline's new main line, from Lake Charles, La., to Tuscola Compressor Station in Illinois, will handle 250,000,000 cu. ft. of natural gas daily, largely for delivery to Panhandle Eastern. Cost of this project is estimated at $80,084,000.

In addition to Trunkline's 740-mile main line, and 560 miles of laterals, the firm will install 32,000 hp. in main-line compressor stations.

The commission conditioned the

Trunkline authorization, however, by requiring that the firm allocate up to 1,500,000 cu. ft. of gas daily to Southeastern Illinois Gas Co., with the remainder of the 250,000,000 cu. ft. to be delivered to Panhandle. It also required Trunkline to submit a tariff satisfactory to the commission at least 3 months prior to commencement of operations. It directed Trunkline to begin construction of its project on or before June 30, and to complete the job by October 26, 1951.

Trunkline's authorization was in the form of an amendment of the certificate previously granted the company. FPC authorized Trunkline on April 29, 1949, to construct a 711-mile pipe line from Edge, Tex., to Palmyra, Neb., for supplying 250,000,000 cu. ft. of gas daily to Northern Natural Gas Co. The latter firm refused to enter into an agreement covering purchase and sale of the gas, however, and Trunkline subsequently filed its application for the proposed amendment.

Panhandle Eastern's project. — Panhandle will construct additional facilities on its system to enable it to transport the new gas supply available from Trunkline, plus an additional 50,000,000 cu. ft. daily which it will draw from the Panhandle and Hugoton gas fields. This project, including approximately 160 miles of line, will cost approximately $15,944,500.

The 188 miles of line previously authorized by the commission will cost an estimated $14,221,000.

FPC ordered further hearing on Panhandle's application to begin in Washington June 12 with respect to distribution of the additional gas among the company's present and prospective customers, and the tariff and rate level applicable to gas delieverable from the Panhandle system.

Although FPC granted authorization of Panhandle's previously authorized facilities in conjunction with the new permit, it reported that the status of the outstanding authorizations should be an issue in the hearings set for June 12. Panhandle was directed by FPC to start and complete its lines on or by the same dates as Trunkline.

Refining Outlook

Current position sound, refiners at A.P.I. meeting agree; prospect for additional products good, problems normal

George Weber

CLEVELAND.—The refining industry has its problems, but it is currently in a sound position, industry leaders agreed at the fifteenth midyear meeting of the American Petroleum Institute's Division of Refining here May 1-4.

Its problems include meeting the constant demand for increasingly higher octane numbers in motor fuel, balancing product supply with demand, and maintaining a proper adjustment of product yields. But, the refiners agreed, the prospects are good that additional products will be needed in considerable quantity.

Smith's remarks.—Chester F. Smith, the Institute's vice president for refining, in expanding on his remarks at the annual dinner, said that in terms of days' supply, present gasoline stocks are no higher than a year ago.

The estimate, he said, is based on an over-all increase of 6 per cent predicted for 1950 demand for all refined products, with gasoline indicating a 7 to 8 per cent increase over 1949.

Concerning the industry's record-breaking construction program, Smith said it was so successful that in 1949 only about 80 per cent of the industry's rated capacity was required, and a similar situation is anticipated for this year. This is in contrast to runs of 90 per cent and higher of rated capacity in the immediatel postwar years.

But the present reserve refining capacity with which the industry can meet any sudden demand or national emergency should be qualified, he said. The term "rated capacity" includes some refinery capacity which is uneconomical to operate and some which is technically obsolete, thus indicating that real capacity figures as a whole are lower than those given.

New fuel demands.—Two fuels of future demand were given attention as promising new outlets for refiners.

Recent developments in commercial jet aircraft and jet engines indicate an excellent prospect for greater economy. This plus the probable public preference for jet travel leads some industry observers to the conclusion that demand for jet fuels will soar sooner than expected.

Commercial jet fuels are expected to vary from the limitary JP-3 specifications, as airlines are expected to show a definite preference for higher-flash fuels.

This long range effect of increased jet-fuel demand, at the possible expense of aviation gasoline demand, may serve to relieve, to some extent, the effort toward higher motor-fuel octane by allowing some diversion of aviation gasoline components to motor fuels, some refiners said.

Developments in gas-turbine pow-

Members of the advisory committee of the A.P.I. Division of Refining, photographed at the fifteenth midyear meeting in Cleveland last week. Left to right, seated, are: Taylor M. Rushing, The Texas Co.; D. P. Barnard, Standard Oil Co. (Ind.); L. C. Burroughs, Shell Oil Co.; John W. Newton, Magnolia Petroleum Co., chairman; E. B. McConnell, Standard Oil Co. (Ohio); and W. T. Gunn, A.P.I. director of refining, secretary. Standing are: M. G. Paulus, Standard Oil Co. (Ind.); A. E. Miller, Sinclair Refining Co.; A. J. Ely, Standard Oil Development Co.; B. H. Barnes, Gulf Oil Corp.; K. G. Mackenzie, The Texas Co.; W. M. Holaday, Socony-Vacuum Oil Co., Inc.; A. P. Frame, Cities Service Co.; C. E. Davis, Shell Oil Co.; E. L. Baldeschwieler, Standard Oil Development Co.; and M. W. Boyer, Esso Standard Oil Co.

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er, both in stationary plants and locomotives, may play an important role in future demand for residual fuels. Current problems encountered in ash and salt deposition on turbine blades can readily be solved, according to some refiners, by proper selection of low-ash crudes for gas-turbine fuel manufacture and by additional desalting of either crude or product.

View on synthetics. — Dr. Robert E. Wilson, chairman of the board of Standard Oil Co. (Ind.) and recipient of the Certificate of Appreciation, echoed Smith's views on synthetic fuels.

"Industry will build plants for making oil from coal and shale just as soon as it is economically sound," he said. "Meanwhile, research and pilot plant work by industry and the Government is continuing in the effort to improve the processes so that they will come closer to being competitive."

"It would be very wasteful," he added, "to build demonstration plants until they were able to compete. Just now the oil industry is continuing to find crude oil faster than the country is using it. So long as oil will run out of the ground as freely as it is running now, processes involving coal and shale oil will have to undergo considerable improvement before they can compete."

Motor-fuels sessions.—The closing day of the 4-day meeting was devoted to two sessions on diesel fuels and gasoline. Two important reports were made on projects of the Coordinating Research Council, Inc.

H. D. Young, of Sinclair Refining Co., Harvey, Ill., leader of the CFR-diesel fuels division, laboratory methods group, reviewed methods for estimating cetane number. Of the five indexes studied, diesel index, characterization factor, ignition quality number, modified ignition quality number, and calculated cetane number—the study group concluded that the latter was most satisfactory.

As a result of the comparative study, they proposed a modification of the CFR Calculated Cetane Number, and outlined advantages and limitations of the method.

Sulfur effects.—A second CFR project concerning the effects of sulfur in motor gasoline on engine operation was reported by R. E. Jeffrey, J. B. Duckworth, and E. J. Gay, members of the motor-fuels division of CFR.

During this extensive 4½-year study, results wer obtained through a cooperative effort by oil companies, automobile and truck manufacturers, and fleet operators from a total of 1½ million test miles.

Findings tended to support conclusions of oil-company engine-lab studies that for sustained operation, increasing amounts of sulfur in gasoline show no alarming effects on engine wear.

The effects of higher-sulfur fuels in the "milk run" or intermittent type of motor vehicle operation are more appreciable. Even in such operation, however, it is considered that good fleet maintenance and use of higher-detergency oils can go far to offset the effects of sulfur on engine wear. Further studies by oil companies were recommended.

The influence of sulfur on road effectiveness of tetraethyl lead, a study presented by D. H. Pulleyblank and W. G. Lovell, of Ethyl Corp., showed that sulfur is only about half as deleterious in road tests as it is indicated to be in the laboratory knock-test engines.

Imports Tax Asked

I.P.A.A. directors make imports prime topic at midyear meeting; domestic demand gain of 5.7 per cent forecast

D. H. Stormont

LOS ANGELES.—The continued high rate of imports of foreign oil and their effect on the domestic petroleum industry dominated discussion at the midyear meeting of the directors of the Independent Petroleum Association of America here May 8-9.

The consensus of those attending the meeting was that the most effective means of controlling imports would be through congressional enactment of increased excise duties, such as the $1.05 per barrel tax proposed in the Gossett bill now being studied by a Senate committee.

Resolutions.—In a resolution made by J. Ed Warren, chairman of the import-policy committee and association head, however, it was stated that relief could be provided by one of three methods.

These consist of: (1) Establishment of a quota on oil imports, (2) providing a quantity balance between exports and imports, or (3) increasing the excise duty.

Such action by Congress was urged, in the resolution, because of the failure to find a solution through industry discipline or administrative action by the federal Government. Continued increases in imports in the current all-time high levels demonstrates that the importing companies cannot be relied upon in effectuating a solution of the problem, Warren said. The State Department not only had failed to recognize the critical import problem, Warren said, but has continued to promote a vast expansion in foreign oil producing and refining operations. Prior to the meeting, telegrams were sent to all heads of importing companies, asking for their views on the import problems.

By resolutions the association also took stands in opposition to American participation in the International Trade Organization, and to the practice of the Government making loans to private industry.

The latter, it was claimed, are unnecessary, stifle competition, encourage uneconomic ventures, invite po-

NEXT WEEK

Oil Search, Rocky Mountain Region.—Dorsey Hager, well-known consulting geologist, Salt Lake City, presents individual structural maps of Montana, Wyoming, Colorado, and northern New Mexico, eastern Utah and northern Arizona, the Dakotas, and western Nebraska; discusses columnar sections and number of "pays" for each.

Diamond Drilling.—Operational data and best drilling practices outlined.

Refinery Maintenance.—Engineers with Leonard Refineries, Inc., Alma, Mich., tell of many time and money-saving procedures developed, detailing maintenance equipment, inspection and cleanup programs.

Big Gasoline Plant.—Built to serve a West Texas producing area of 70,000 acres, new installation at Levelland is jointly owned by 10 companies and 2 individuals. Stanolind Oil & Gas Co. is operator, and article by three of that company's engineers gives design data, describes operation.

Pumping Deep Wells.—Three Carter Oil Co. engineers give factual data and costs for 10,000-ft.-plus installations.

Drill in 500 Ft. of Water?—Plans for new mobile offshore rig are disclosed by J. R. Pemberton and Hillman A. Hansen, representing West Coast interests.

New-Type Gas Compressor Station.—Installation recently completed by Tennessee Gas Transmission Co. near West Monroe, La.

Use of Periodicals, Petroleum Research.—Librarians at Carnegie Institute of Technology, Pittsburgh, analyze statistical data for various technical publications and oil magazines.

litical preferences, and result inevitably in government control.

Economics report.—In giving the report of the economics committee, Chairman H. B. Fell, of Ardmore, Okla., forecast that this year would result in 5.7 per cent increase in the domestic demand of all oils.

The total demand for all oils, both domestic and export, was placed at 6,468,000 bbl. daily, or 349,000 bbl. more than in 1949.

Kerosine and distillate, with increase of 12.8 per cent and 15.6 per cent, respectively, were forecast to show the largest gains. The committee estimated that a 17,000,000-bbl. over-all decrease in stocks of all oils would be shown during 1950.

Stripper-well meeting.—Executive officers of the National Stripper Well Association, which held its meeting in conjunction with the I.P.A.A. on Monday asked that a renewed effort be made to "hold the line" on the percentage depletion allowance.

While many thousands of stripper-well operators have expressed opposition to any change in the allowance, the group was fearful that without continued pleas the House ways and means committee may feel the industry has lost interest.

Other action taken by the stripper-well group was the authorization for a study of California stripper wells.

The study is to be made by E. C. Dahlgren, special consultant to N.S.W.A., in cooperation with the group's California section, the Oil Producers Agency of California and San Joaquin Valley Oil Producers Association.

Phillips Hearing Delayed

WASHINGTON.—The Federal Power Commission has postponed from May 15 until June 26 the Bartlesville, Okla., hearing in FPC's investigation of the natural-gas operations of Phillips Petroleum Co.

Phillips requested a 30-day continuance so that it might adequately prepare for the hearing.

791-Mile Line Planned

NEW YORK.—Application has been made to the Federal Power Commission by Texas Eastern Transmission Corp. for permission to construct a 791-mile, 30-in. natural-gas pipe line to supply up to 476,400,000 cu. ft. of gas daily to New England and to its present customers in the Appalachian and Seaboard areas. Estimated cost of the facilities is $117,800,000.

The application is an amendment to the previous application filed by Texas Eastern in 1948. Annual sales through the new facilities are estimated at 142,201,000,000 cu. ft.

Algonquin Gas Transmission Co., a newly formed company proposing to serve natural gas to the New England area, will be the primary customer for the new line, taking up to 260,000,000 cu. ft. daily. The remaining gas will go to present Texas Eastern customers. Hearings on applications to serve New England reconvened before FPC in Boston May 8.

Plans involving underground gas-storage facilities in the Appalachian area that will permit Texas Eastern to operate its entire pipe-line system at an annual load factor of 97.5 per cent were announced in the application. Another joint application will be filed soon with another firm requesting permission to acquire and operate the underground facilities.

Texas Eastern has contracted with United Gas Pipe Line Co. to purchase nearly all of its requirements for the new project, 134,000,000,000 cu. ft. of gas annually, at a point near Kosciusko, Miss.

Gas and the Public

Speakers tell A.G.A.'s Natural Gas Department pressing need of industry is for better public relations program

Henry D. Ralph

TULSA.—The need for better public understanding of how the gas industry operates was the principal theme of the spring meeting of the Natural Gas Department of the American Gas Association here May 8-9.

With the background of the recent veto of the Kerr natural-gas bill, the attack on the depletion allowance for gas producers, and the demands of many consuming areas for natural gas, the meeting reflected a general feeling that good public relations is the basis for solution of many of the industry's problems.

President's talk. — "Gas lines make headlines" was the phrase used by Hugh H. Cuthrell, president of the A.G.A. and vice president of Brooklyn Union Gas Co., Brooklyn, N. Y., in explaining that the industry at present is so much in the public eye that "the white light of national publicity magnifies our every move."

"Public relations is a much abused and confused term," said Cuthrell, "but to me it boils down to the constant practice of good leadership—leadership in the public interest. Leaders in a democracy are the men and women who make friends and influence people by word and deed. That means winning the support of all forces who make up our society.

"It is incumbent upon us to take every step with extraordinary caution lest we unnecessarily align powerful public and governmental forces against us. We all know there is vigorous competition among pipe-line companies to serve certain profitable markets. There is no less a scramble among various utilities to secure adequate supplies of a fuel that will alleviate their economic difficulties and allow expansion of their service. So far so good.

"But every one of us should keep

Early arrivals for this week's meeting of the Natural Gas Department of A.G.A. Seated, left to right, are F. A. Hough, chairman of the transmission committee and vice president of Southern Counties Gas Co., Los Angeles; D. A. Hulcy, department chairman and president of Lone Star Gas Co., Dallas; and Elmer F. Schmidt, chairman of the technical and research committee and vice president of Lone Star Gas Co., Dallas. Standing is A. J. Kerr, vice president of Rockwell Manufacturing Co., Pittsburgh.

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constantly in mind that any unsound pipe-line expansion or any allocation or pricing of gas contrary to the general good, will ultimately react to the detriment of the gas industry.

"Our path in the next few years is strewn with obstacles which could undermine our entire future as one of the nation's prime essential industries. It is my firm conviction that the industry will stand or fall from grace depending upon decisions which we make today."

Chairman's address.—Much the same thoughts ran through the report of D. A. Hulcy, chairman of the Natural Gas Department and president of Lone Star Gas Co., Dallas, who said:

"The tremendous advancement of the natural-gas industry has spotlighted it for political attacks, and our program for the future must intensify our efforts with respect to a better public understanding of the industry and its many problems.

"In considering a program directed to the public, I think we should first critically examine ourselves. We must see that we ourselves, by our actions and deeds, exemplify an honesty of purpose and fair dealing with each other and in the different segments of our business which will command public respect.

"Our growth and development is a strong, healthy advance and carries with it the responsibility for protecting our customers, employes, and investors against spurious attacks, by those who seek political advantage or those of our competitors who would give false information for competitive advantages."

Disney speaks.—The most challenging discussion of this subject was made by Wesley E. Disney, general counsel of the Independent Natural Gas Association, Washington. After reviewing congressional proposals and administrative action unfavorable to the gas industry, Disney said:

"Congressmen have recently said, in substance, that the oil and gas industry has poor public relations. Some of them have made it more emphatic than that.

"The gas business is at least a quasi-public business. You constantly deal with the public and its representatives. The public's representatives usually respond to what the public wants, or what they believe the public wants.

"So if your contacts and impressions with the public are those of hostility, that is surely reflected in what is done in official life. The delight of many molders of public thought is to lampoon the utility business, which in earlier years in our history enjoyed a very bad reputation with the public.

"But given the facts, public opinion can usually be counted as fair—you must have the confidence of the public mind.

"Your problem is how to achieve as soon as possible, what you do not have now, fair public relations—at least, improved relations."

The close vote on the Kerr bill, its veto by President Truman, and the disposition of the Federal Power Commission to reverse its former position and make an attempt to regulate independent producers of natural gas, all reflect a public belief that the natural-gas industry should be more closely regulated, Disney told the convention.

But a more subtle threat to nationalization of the industry lies in proposals to create a federal fuel administration, he warned.

Close to a dozen proposals are now pending in Congress to set a national fuel policy, he said, all stemming from President Truman's suggestion that a study be made of the coal industry following the recent protracted strike. Several of these propose to create a fuel administration to regulate all fuels, and this means price fixing and probably eventual nationalization, Disney declared.

"To regulate the fuel resources of this nation, diverse as they are, would not only imply, but would demand, the absolute control over these resources by the Government, and over the private owner thereof, as well as the power to adjust and fix prices," Disney predicted.

"Most seriously, if the forces of propaganda which defeated the Kerr bill are loosed on the American public, a fuel administration would be created by the Congress in spite of all the protests the industry could voice at this time.

"It is plain that there is a school of official thought in Washington, chiefly most well-intentioned, contemplating a policy as to all fuels. The very words 'fuel administer" imply regulation, control, and price fixing. The creation of a fuel administration opens the door to the practical development of a spread of the philosophy of regulation and control of other industries. What further steps will lead us toward socialism and nationalization I leave to your own contemplation."

As to what the natural-gas industry faces as a result of the defeat of the Kerr bill, Disney said:

"If the northeast zone gets gas without the Kerr bill—that is, if the producers and gatherers take the hazard and sell their gas to the big interstate pipe lines, so that the populous areas to be served receive a satisfying amount of gas; if the field price of gas does not go skyrocketing; and if the Federal Power Commission does not rescind Order No. 139 and start, at a rapid rate, declaring producers and gatherers to be natural-gas companies, then comparative quiet may reign on the legislative front for some time.

"But, if the converse of these hypotheses occurs, then the search for a remedy for the producers and gatherers will continue."

Industry growth.—The rapid growth of the natural-gas industry was also a topic of considerable discussion at the convention. Several speakers cited comparisons with the size of the industry only a few years ago, but none put a top limit on its expansion.

A satisfactory picture of reserves to supply the growing demand was painted by M. C. McGowen, president of United Gas Corp., Shreveport, and chairman of the A.G.A. committee on reserves.

The nation's proven reserves of natural gas stand at 180.4 trillion cubic feet, and in spite of withdrawals of 22.7 trillion cubic feet during the past 4 years our reserves have increased 32.6 trillion cubic feet, McGowen declared.

Most of these reserves are in New Mexico, Texas, Oklahoma, Arkansas, Louisiana, and Mississippi, which have 82 per cent of the total. Texas and Louisiana together account for 70 per cent of the total, and it was in these two states that most of the gas was found in 1949.

Our reserves of natural-gas liquids have also shown substantial increases during the past 4 years, and now stand at 3.7 billion barrels, McGowen said.

Without attempting to give any figures on undiscovered reserves, McGowen declared there is every indication that new reserves of natural gas will continue to be discovered for a good many years, and he warned against dividing proven reserves by annual production and concluding that gas will be exhausted within a given number of years.

Symposiums.—Two symposiums occupied prominent places on the program. One was a series of reports on the various technical research programs conducted by A.G.A. into such problems as removal of nitrogen, pipe-line flow, welding practices, and similar problems of the industry.

The other was on the relation between higher operating costs and rates. The general conclusions of the speakers was that costs cannot be reduced materially and that while there may be some adjustments in rates to reflect differences in the costs of various types of services, the chief prospect for improving revenues of utility companies is to increase the year-around consumption of gas by customers along mains already laid.

Engineering papers.—Among the technical papers presented was one giving operating data on Socony-Vacuum's new solid desiccant, S/V Sovabead, for natural-gas drying operations. Sovabead is a siliceous material, with high moisture adsorption capacity. In addition, the spheroidal

(Continued on page 144)

RFC Explains Loan

Agency answers Senators' charges, says loan meets all requirements with wide safety margin, is no "bail out"

Bertram F. Linz

WASHINGTON.—Preservation of oil reserves such as those involved in the $10,100,000 government loan to Texmass Petroleum Co., variously estimated from 7,000,000 to 12,500,000 bbl., is in the public interest, Reconstruction Finance Corp. declared this week in answering charges by a Senate banking subcommittee that the loan was ill-advised and granted without adequate consideration.

The loan meets all of the qualifications required by the RFC act, it was asserted, with a wide margin of safety.

This is particularly true, the RFC said, since (1) no income from the company's gas reserves was included in estimates of revenues from which the loan would be repaid, and (2) the estimated unrealized value of the original proven drilled oil reserves remaining at the end of the 10-year loan period is in excess of $13,000,000.

This amount, together with the value of the undrilled proven oil reserves and the gas reserves, was considered to be more than ample to assure repayment of the entire loan at the end of 10 years.

Loan explanation.—The RFC pointed out that it was apparent the company did not have sufficient working capital to maintain its properties adequately and that competent engineers advised that continuation of this situation would result in a permanent loss of substantial reserves which would otherwise be recoverable through proper maintenance.

During the period in which the application was under consideration, the RFC was convinced that the financial assistance needed was not otherwise available on reasonable terms. At RFC's insistence, however, contributions of capital and standby agreements from private sources were effectuated, thereby substantially reducing the amount of governmental assistance originally requested.

It was pointed out, further, that it is possible for there to be a difference of opinion with respect to a majority of its loans which, by their nature, normally do not meet the usual banking standards.

The long period of study and the many reports on the application, however, disprove the subcommittee's charge that the loan was subjected to "only casual and superficial consideration and study," it was declared.

No "bail-out."—Denying that the loan is a "bail out" of investors and creditors, the RFC explained it would not consider a loan except upon the basis of a first mortgage on all the property, which necessitated the release of present liens, and before that could be made possible it was necessary to provide for a partial payment of the company's indebtedness.

The purposes of the loan are (1) to eliminate joint interests and other conditions which apparently created impossible operating conditions, (2) provide working capital for rehabilitation and development, and (3) convert short-term indebtedness to a longer term.

Engineers' report. — The RFC made public a report from Keplinger and Wanenmacher, Tulsa petroleum engineers, answering charges that the Texmass wells are marginal producers.

The report pointed out that the Texmass wells averaged 10.25 bbl. per day per well last November, comparing favorably with the national average of 10.5 bbl., and said that after they are reconditioned the average well should exceed 15 bbl. per day.

The somewhat higher cost of production, it was held, may be offset by the fact that the production decline on the small wells is much less than on flush wells.

New setup? — Another development involving the RFC was the disclosure by President Truman that he will send a reorganization plan to Congress transferring the agency, now independent, to the Department of Commerce as part of his program of government-insured loans and other assistance to small business.

His proposals included the relaxation of the requirements for RFC loans and extension of the maximum loan period from 1 to at least 15 years. One of main charges leveled against the Texmass loan was that it could not be fully repaid within the 10-year limit now provided by law.

The President told Congress that while business is thriving it is not growing fast enough, and governmental assistance is needed by the smaller enterprises.

His proposals included government insurance of bank loans up to $25,000, the creation of federally chartered national investment companies to provide equity capital and long-term loans under supervision of the federal reserve system, and establishment in the Department of Commerce of a clearing house for scientific, engineering and managerial information of interest to small business.

OGD Slight Explained

WASHINGTON. — Refusal of the House appropriations committee to provide funds specifically for operation of the Oil and Gas Division was based on the debatable ground that the agency was not authorized by law and funds would be subject to a point of order if included in the omnibus appropriation bill.

Giving this explanation, Rep. Henry M. Jackson of Washington, appropriations-committee member who was steering the Interior Department appropriation through the House, declared that under the bill authority had been delegated to the Secretary of the Interior to use funds for the OGD, a statement which was challenged by Rep. Oren Harris of Arkansas, who said the Secretary of the Interior didn't view the situation that way but as a prohibition against continuance of the OGD as presently set up.

"It may be that the department will want to use this money for some other activity, but that is not the fault of the committee," Jackson retorted.

Jackson refused to consider an amendment which would specifically provide funds for the OGD, telling Harris he should introduce legislation to authorize its activity. He did not offer any explanation, however, of why the committee now felt an appropriation could not be included in the money bill when heretofore it had provided funds for the OGD in Interior Department supply measures.

Pollution Study Planned

WASHINGTON. — Representatives of the oil industry and 18 other groups interested in water pollution problems met here this week to organize a national technical task committee on industrial wastes under the auspices of the Public Health Service.

Lee C. Burroughs, of Shell Oil Co., chairman of the waste-disposal committee of the American Petroleum Institute, will represent the oil industry on the committee, which will draw up a program to solve water-pollution problems caused by industrial wastes for which no methods of treatment have been developed and to improve existing waste-treatment methods where needed.

The problem of water pollution was taken up following a 3-day meeting last week at which problems of air pollution were discussed.

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New Fuel

Investigation to determine national policy proposed

WASHINGTON.—A $100,000 congressional investigation of the whole fuel situation with a view to formulating a national fuel policy was proposed in the House last week by Rep. James E. Van Zandt of Pennsylvania.

The policy would cover all forms of energy except atomic energy.

A striking feature of Van Zandt's resolution was that the investigation would be conducted by a joint committee drawn from the Senate interior and House public-lands committees, bypassing the House interstate-commerce committee, which has been studying the fuel problem over a long period but so far has failed to come up with any legislative proposals.

The joint committee would be required to submit its report and recommendations by not later than September 15 and in order that it might do so would be authorized to continue to work through the recess of Congress.

A number of measures providing for investigations of the coal situation, the oil-imports problem, and other segments of the fuel question have been introduced in Congress, but the general sentiment appears to favor an over-all inquiry which would set the stage for adoption of a national policy covering all fuels.

The oil group of the House interstate-commerce committee has held a number of hearings on the oil situation and plans to recall officials of the Federal Trade Commission May 19 to testify regarding the latest increases in the price of gasoline.

Rep. Oren Harris of Arkansas, who is chairman of the subcommittee, protested on the floor of the House over invasion of the oil field by other committees, notably the House education and labor committee which has set up a subcommittee to study the effect of imports on domestic industry, including the oil industry.

Harris indicated the interstate-commerce committee would fight any proposal to turn fuel investigations over to other groups, pointing out that under the Reorganization Act it was given specific jurisdiction in that field.

Basing Point Chances Poor

WASHINGTON.—Chances of enactment of the O'Mahoney bill to permit sellers to quote delivered prices and absorb freight are held by observers here to be at a very low level.

Failure of the Senate to act promptly on the measure, agreed to by the conferees 3 months ago, has been used to advantage by Rep. Wright Patman of Texas and other opponents of the bill to carry on a widespread publicity campaign against it similar to the one which influenced President Truman to veto the Kerr natural-gas bill.

Repeated unsuccessful efforts to bring the bill up have been made in the Senate, where Democratic Leader Scott Lucas of Illinois now says it will not be called until after the fair-employment practices legislation is disposed of. The FEPC bill is expected to take 2 or 3 weeks, which means that basing point will not be considered until late in May, at the earliest, and possibly well along in June.

Because of the constant hammering to which supporters of the bill are being subjected, the longer the measure is deferred the more precarious its position becomes, and acceptance by the Senate of the conference report already approved by the House definitely is doubtful.

Ickes Asks Tidelands Study

WASHINGTON.—Former Secretary of the Interior Harold L. Ickes tried to stir up the California tidelands oil situation this week.

In a brief filed with the Supreme Court, Ickes asked an investigation of the agreements under which the oil companies have been operating in the submerged lands since the court's decision in June 1947 held that the federal Government had "paramount rights" over the offshore oil.

Ickes, who headed the Interior Department when the California suit was brought, charged that the agreements approved by the Justice and Interior Departments and the state authorities to provide for continuance of operations pending settlement of the boundary issue, were entered into without statutory or other authority and that actions taken under those agreements are illegal, null, and void.

MEETINGS

Gas-Technology Course

KINGSVILLE, Tex.—The fifth annual Short Course in Gas Technology offered by the Texas College of Arts and Industries will be held here May 29-31.

The course is sponsored by the Southern Gas Association. It is divided into two technical sections, one entitled "Latest Methods for Solving Important Problems of Production and Transmission," and the other, "Improved Techniques in the Utilization of Natural Gas."

R. H. Ulrich, Southern Natural Gas Co., Birmingham, is chairman of the production and transmission section, and William B. Wood, Rio Grande Valley Gas Co., Brownsville, is chairman of the utilization section.

Gas Conference

NEW YORK.—The 3-day Production and Chemical Conference of the American Gas Association will be held in the Hotel New Yorker here May 22-24.

Of particular interest to natural-gas men will be a symposium on reforming of hydrocarbon gases and luncheon conferences on high-B.t.u. gas and chemistry in the gas industry.

Technical papers to be presented will include: "Experiences at Cambridge with the Hall High-B.t.u. Process," by Gordon G. Howie, Cambridge Gas Light Co.; "Plant Waste Disposal," W. B. Hart, Atlantic Refining Co.; "Public Health Service Water-Pollution Control," L. F. Warrick, U. S. Public Health Service; and "Underground Storage of Natural Gas," F. E. Vandaveer, East Ohio Gas Co.

Gas Competition Symposium

NEW YORK.—A symposium on natural-gas competition in the East will be held here May 15 as a part of the 2-day tenth annual convention and trade exhibit of the Empire State Petroleum Association in New York.

Speakers for the symposium include Dr. Courtney Brown, Standard Oil Co. (N. J.), economist; H. B. Van Cleve, president of Maritime Petroleum Corp.; and several others who will discuss advertisng, sales training, and standards in the oil-heating business. Baird H. Markham, director of the American Petroleum Industries Committee, will speak on legislative activities affecting the industry May 16, and Paul G. Blazer, chairman of Ashland Oil & Refining Co., will discuss other factors in the marketing field May 15.

SOUTHWEST

It's Now Kelley-Snyder

AUSTIN.—The North Snyder and Kelley fields of Snyder County have been officially combined by the Texas Railroad Commission and have been given a single set of field rules. The field has been renamed Kelley-Snyder.

The new rules are similar to those in effect for the individual fields and include 40-acre spacing. The allowable limit for the field has been kept at 220 bbl. per day, that existing previously in the combined fields and in Sharon Ridge (Canyon) and Diamond-M fields.

Hearings to consider the relationship of Diamond-M, Sharon Ridge, and Cogdell reef fields with Kelley-Snyder will await further development work in the Scurry County area.

New Refining Process

Modified T.C.C. process features gas lift, simpler design; 10 units to be in commercial operation by end of this year

George Weber

A NEW modified Thermofor catalytic cracking process will be in commercial operation by the end of this year in 10 new units in the United States and Europe.

This new version of the moving-bed process is licensed by Socony-Vacuum Oil Co., Inc., and incorporates a number of major improvements over the original T.C.C. process introduced by that company in 1943.

The revised process features simplification of the catalyst regenerator and the use of gas lift to convey catalyst pellets between regenerator and reactor. Simplified design is aimed toward savings in both installation and operating costs. It is expected at the same time to provide greater efficiency and flexibility by providing higher catalyst-oil ratios than former units.

The model shown in the accompanying sketch is patterned after the 15,000-bbl. per day units being installed in this country.

Units Planned.—To date, Socony-Vacuum has contracted for construction of seven 15,000-bbl. per day units of this new design in its own and affiliated refineries in this country.

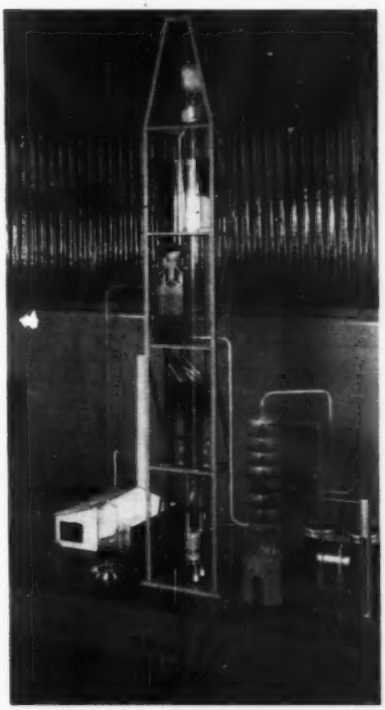
Four are under construction at Socony-Vacuum plants in Trenton, Mich.; Augusta, Kans.; and Buffalo and Brooklyn, N. Y. Three are going in at the Beaumont, Tex., refinery of Magnolia Petroleum Co. These seven units will replace seven 10,000-bbl. per day fixed-bed Houdry catalytic cracking units built before the war.

Construction of three units has been licensed outside the company. Standard Oil Co. (Ohio) is well under way with construction of two at Cleveland, also replacing Houdry units. A third unit, rated at 8,000 bbl. per day is scheduled to be installed in an undisclosed European refinery.

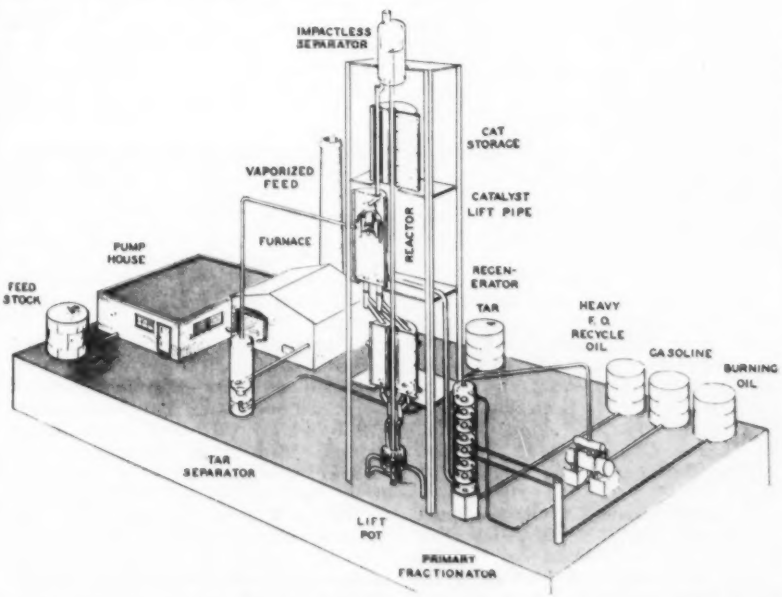
Addition of these nine domestic units with an aggregate feed capacity of 127,000 bbl. daily will boost operating T.C.C. capacity in this country approximately 50 per cent, totaling in excess of 400,000 bbl. daily.

The first units to go into operation at Trenton, Beaumont, and Cleveland, are set for completion in September.

Catalyst lift.—Replacing the mechanical bucket elevator is a straight air lift. Hot regenerated catalyst drops from the regenerator or kiln to a lift pot for elevation to the top of the unit.



Working model of a unit employing the modified T.C.C. process developed by Socony-Vacuum Oil Co., Inc. The model was first displayed at the company's recent annual stockholders' meeting. Operating details of the new process are published for the first time in the accompanying article.



Sketch showing layout of a unit employing the new process. Sketch represents the design of 10 new commercial units now contracted and under construction in seven refineries here and abroad. The new units will be capable of charging 135,000 bbl. per day of feed for production of high-octane gasoline and distillate fuels.

Low-pressure air from the blower section enters the lift pot in one primary line and two secondary lines, lifting a controlled amount of catalyst in nonturbulent straight-line flow to the catalyst separator atop the unit. Secondary air is controlled to admit sufficient total air for lifting the desired volume of catalyst.

Catalyst pellets fall to the bottom of the separator while air is vented overhead from the system. Catalyst from the separator enters the reactor by means of a circular falling curtain in the center of the vessel, and by drop legs to the moving catalyst bed.

The catalyst moves through the reaction zone concurrently with incoming hydrocarbon vapors to the stripper or vapor-disengager section where spent catalyst is stripped before leaving the reactor vessel. It then moves by gravity through drop legs to a doughnut-shaped regenerator.

Reactor design of the new units is essentially unchanged. It will operate on a total vapor feed, as shown in the accompanying sketch, or on a vapor-liquid feed mixture.

In the latter case, up to 80 per cent of the catalyst may enter the reactor as a falling curtain where it immediately contacts and vaporizes

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liquid feed sprayed into the curtain.

Regenerator simplified.—The newly designed catalyst regenerator features a simplified single burning zone, replacing the multiple burning zones of previous units. Cooling coils located in the base of the kiln below the burning zone provide flexibility of the cracking operation by regulating catalyst temperature on its return to the reactor. Regeneration takes place at atmospheric pressure.

In the unit illustrated, liquid feed is charged to the furnace and is flashed in a tar separator. Overhead vapors pass directly to the reactor, and unvaporized bottoms from the atmospheric tower are withdrawn from the unit. Cracked vapors from the reactor are conventionally fractionated to three principal product streams.

Maximum vaporization of feed to the reactor is recommended, to allow the cracking reaction to take place at more moderate catalyst-oil ratios.

An alternate to the crude feed preparation shown in the sketch employs the addition of a small vacuum unit charging the bottom fraction from the tar separator. This will provide additional vapor feed and reduce crude to about a 15 per cent bottom fraction with a minimum expenditure for vacuum facilities.

The combination of vapor and liquid feeds will be determined by the over-all requirements of each individual refinery processing schedule.

Unit layout.—Designers say the illustrated over-all design, superimposing reactor and regenerator, has proved most practical for units with capacity up to 15,000 bbl. per day.

With this arrangement, the top of the reactor will be about 120-130 ft. above grade. Hot catalyst storage, shown installed above the reactor, can be located lower in the unit when over-all height reduction is desired.

Data on lift.—Velocity of the catalyst lift is to be so controlled that catalyst pellets will "fountain" at the top of the lift pipe, for reducing or eliminating any impact against the dome installed inside the separator. This control of catalyst lift could reduce erosion of equipment and catalyst attrition to a negligible level in the impactless separator.

The catalyst lift system was tested and proven in a full-scale lift pipe installed for experimental purposes on the existing T.C.C. unit at Socony-Vacuum's Paulsboro refinery.

The 200-ft., 16-in. diameter lift pipe was found capable of lifting 250 tons of catalyst hourly. Higher lifting rates will be possible, but the circulation rate noted above will suffice for recommended catalyst-to-oil ratios in the range of 3:1 to 5:1 for 15,000-bbl. per day units.

Catalyst lifting requirements under these conditions will be met with a single-stage, 250-hp. blower. It may be installed as a separate unit, or lift air may be supplied by a common blower bank also furnishing regenerator air.

The new T.C.C. units will operate efficiently on any catalysts (either natural clay or synthetic) used in older models. Designers expect wide use of the new chrome bead catalyst since, they point out, it maintains comparable cracking characteristics with others but reduces after-burning and improves the CO_2:CO ratio in flue gas. Utilization of the waste-heat boilers in the flue gas line, they say, is not economically justified.

WEST COAST

Nevada Test

Plans for first wildcat by major firm announced

LOS ANGELES.—Plans for the first thorough test of Nevada's oil potentialities were announced here this week.

A 7,500-ft. wildcat, to be drilled jointly by Continental Oil Co. and Standard Oil Co. of California, will be spudded in in the northeastern part of the state, probably within the next month.

The proposed depth is expected to be sufficient to test the oil possibilities of Silurian and shallower beds.

While Nevada has received some drilling in the past, all tests were carried to only shallow depths and were largely located in the Las Vegas area at the southwest end of the state.

Deepest test on record, in Churchill County and south of Fallon, was only to 2,845 ft. The test will be the first drilled by a major oil company; all other attempts were made by companies requiring public sale of stock for financing the hole.

The test will be located about 45 miles west of Ely, in SW Section 31-16n-56e, White Pine County. It has been designated the operators' 1 Meridian Unit. Contract for the well had not been let last week.

Staking of the wildcat follows some 2 years of field work on Continental's part, including extensive seismic work. Both Continental and Socal have extensive leases in this area. Among other major companies which have leases and have been doing field work in the area are Shell Oil Co., The Texas Co., Richfield Oil Co., Phillips Petroleum Co., and Union Oil Co.

The major leasing activity has been in a spread from 8 to 50 miles west of Ely and northward into Elko County. It is reported that some 2,000,000 acres of Nevada lands are under lease, of which more than 80 per cent is government range lands.

Because of the large amount of government lands involved, some of the major companies are attempting to provide for unitized operations in the event oil is discovered.

Cuyama Housing Program

LOS ANGELES.—To provide housing for its employes, as well as those of other oil companies operating in the area, Richfield Oil Corp. has started construction on a model community near its properties in South Cuyama and Russell Ranch fields of Cuyama Valley.

The project is being undertaken by a recently formed Richfield subsidiary, Cuyama Valley Community, Inc.

The planned community is needed because of the remoteness of the Santa Barbara County development, 37 miles southwest of Taft, in Kern County, and 56 miles east of Santa Barbara. Planned facilities include shopping, church, library, medical and dental, and banking.

Residential lots have been marked off for 320 homes and space has been provided for more than 600 in all. Bids for the initial block of houses will be asked this month.

In addition to Russell Ranch and South Cuyama fields, two other fields recently have been discovered in the valley and the general opinion is that still more will be found.

Approximately 235 wells are now producing about 40,000 bbl. daily. Drilling is going steadily ahead with about 15 rigs operating in the area. A total of 30 oil companies have interests in the valley.

Town-Lot Innovation

LONG BEACH.—A town-lot area well within Long Beach city limits, heretofore undeveloped because of a 1927 city ordinance prohibiting drilling within corporate limits, may soon be the scene of an extensive drilling program.

Petitions asking that the ordinance be amended to the extent that controlled directional drilling will be allowed from fenced-in "islands" are soon to be circulated in Long Beach. If the necessary signatures are secured, the proposed change will be voted upon in a special election next month.

A community lease covering 500 acres of town-lot properties has been obtained by Continental Consolidated Corp. of Long Beach and Los Angeles.

All wells will be directionally drilled from rigs located on an "island" near the center of the lease. It is thought that all buildings will be removed from the drill site and the area fenced and landscaped.

It has long been thought that the offshore oil reservoirs in Long Beach Harbor extend well inland into the city. If this proves to be the case, and if conventional Ranger zone well spacing is followed, the project will require the drilling of about 100 wells.

MIDDLE EAST

Private Settlement

Arbiter holds I.P.C. concession includes offshore waters; Superior concession covers only Qatar continental shelf

A PRIVATE arbitration has held that the concession of the Iraq Petroleum Co., Ltd., organization in the Persian Gulf sheikhdom of Qatar extends over territorial waters and islands as well as the land area.

This decision leaves the concession negotiated last year by Superior Oil Co. valid only on the Qatar Continental Shelf territory. The Qatar sheik has already proclaimed his dominion over underwater resources on the adjacent Continental Shelf.

Presumably the Qatar territorial limits will be placed at an offshore distance of 3 miles. It is reported this has been recommended by the Foreign Office of Britain which has special treaty relationship with the smaller Persian Gulf governments. The sheik, however, has not yet declared the extent to which he claims his territorial limits.

The arbitration group, headed by Lord Radcliffe, distinguished British jurist and attorney, was purely a private matter to determine the meaning of the original concession now held by Petroleum Development (Qatar) Ltd. There still remain the political questions of not only the Qatar territorial boundary but also the boundaries in the Persian Gulf between Qatar and Bahrein and Qatar and the wholly independent kingdom of Saudi Arabia.

Work has been under way for some time between representatives of Qatar and Bahrein to determine the boundary between these two governments. Elsewhere it will be necessary to do considerable detailed work to determine the exact offshore territorial boundary of the Qatar sheikhdom, even after its offshore limit is set.

Superior may have some Continental Shelf area on the west side of the peninsula. From an oil standpoint, this appears to be the most interesting territory since it is on this side of the peninsula that I.P.C.'s Dukhan field is located. The Superior company also will have its rights beyond the territorial-waters limit on the east side.

I.P.C. will continue to hold concession rights over all the sheikhdom including islands out to the territorial limit. It contended its concession extended over the entire area held by the sheik, and at the time this concession was negotiated in 1935, Continental Shelf development was a little considered concept. Petroleum Development (Qatar) Ltd., is an associated company with I.P.C. through Petroleum Concessions, Ltd.

Now in the preliminary stages of arbitration are two of the concession contracts held by another I.P.C. company, Petroleum Concessions (Trucial Coast) Ltd., southeast of Qatar. Here the question is whether the concessions extend beyond the territorial limits.

The definite terms of the concession that Superior negotiated with Qatar have never been fully revealed. It is reported the company has a drilling obligation to be effective. A considerable bonus also is understood to have been given.

The decision in the Qatar arbitration came after hearings which were held in Qatar. The question at issue was the intent of the original signatories to the agreement. The sheik's son presented material, and also the now-retired Anglo-Iranian Oil Co., Ltd., official who participated in the original negotiations.

Many difficult boundary questions have arisen in the Persian Gulf because of the possibilities of offshore oil development. It is felt by some observers of the problem that ultimately a Persian Gulf conference may be necessary among representatives of the affected governments to reach an over-all settlement. This would follow the general pattern established by Venezuela and Britain in the Gulf of Paria between Trinidad and Venezuela.

New Aramco Office

As a part of its program of partial conversion to a soft-currency basis, Arabian American Oil Co. will set up a branch in Rome, it was announced this week.

The Rome office will be established by Aramco Overseas Co. and will be used primarily as the European engineering headquarters and for recruiting Italians for employment and for the purchase of equipment, materials, and supplies in nondollar areas.

R. S. Fowler, vice president of Aramco Overseas Co., will be in charge of the new Rome office. The Italian capital has long been a stopover for Aramco's planes on regularly scheduled trips between New York and Dhahran, Saudi Arabia.

Arabian American, itself, will continue to maintain headquarters in New York.

Tapline Worry

Syrian right-of-way again questioned as to legality

NEW discussion of the transit agreement between the Syrian Government and Trans-Arabian Pipe Line Co. has been raised in Damascus.

The company obtained approval of its agreement from the de facto government of Marshal Husni Zayim last summer. The Zayim regime was overthrown and the marshal killed a few months later.

Considering that the acts of Zayim's recognized government were valid and would be honored, the company has gone ahead with construction of the line. At the beginning of May, two spreads were working in Syria with about 5 miles of the 82-mile stretch through the country laid.

Reports from Damascus last week said the legality of the transit agreement may be questioned as a result of a clause in the draft of Syria's new constitution. This provides that international agreements such as the one with Tapline be submitted to the Chamber of Deputies for approval.

Whether this will cause further serious difficulty to the project is not clear at this time. Although some anti-American feeling has been fomented in Syria in recent weeks over such incidents as newspaper handling of the bomb explosion in the garden of the American Legation, the view may be taken that the Tapline agreement as an accomplished event requires only formal ratification.

Before last year's agreement with Zayim, the Syrian political situation was for months a major obstacle for the pipe-line project. In 1948, feeling against the United States over the Israeli issue was such that it was not possible to obtain approval of transit rights at that time.

The agreement signed last summer favored Syria with minimum transit fee of 20,000 pounds a year, the right to buy up to 200,000 tons of oil annually for use within the country, and about $160,000 a year for policing the line.

Zayim dissolved the parliament while he was in power, and formal legislative approval was not possible at the time.

XUM

Pickup in Germany

Discovery of anticlines, stratigraphic traps may mark new era in nation's history; record drilling program planned

NORTHWEST Germany belongs to the historic oil-producing areas of Europe where the existence of heavy crude from surface outcrops and pits dates back to early centuries. The oil province of northwest Germany has had periods of stimulated drilling, in the late twenties, during the period 1935-37, and again during the war in 1942-44, when the promising deposits in the Emsland border region were discovered. These now head the German production list.

It appears, however, that the latest successes surpass those of all previous years in future significance and that 1949 marks the beginning of a new era in the development of the oil industry in northwest Germany.

The German Geological Research Office recently submitted a new estimate giving a total of 36.5 million tons proven reserves (about 260,000,000 bbl.). This figure includes 21.7 million tons certain and 14.8 million probable reserves. Compared to the estimate made at the end of 1948, this is an increase of more than 150 per cent.

New prospects.—Nine new oil fields or new field areas were discovered in 1949 and in the first month of this year.

However, it is not the opening of new fields with the resulting considerable increase of the reserve figure in itself which makes the year 1949 so remarkable but the fact that, with the help of improved methods of reflection seismic research, structural types were found which previously had been unknown in the country.

In the past the search for oil in the province of Hanover and in Schleswig-Holstein was directed exclusively at top or flank positions of salt domes. In 1949 for the first time two oil deposits were found here on deep anticlines, intermediate structures between salt domes.

This opened up entirely new prospects for wildcatting in the classic production areas around Hanover and in Schleswig-Holstein. The successful wildcat well Scheerhorn (Emsland region) was the first instance of the existence in Germany of deposits of the stratigraphic-trap type.

Map of northwestern Germany showing new discoveries made last year and existing fields.

Finally, the strike at Quakenbrueck in South Oldenburg in late January 1950, where oil of a quality similar to that of the Emsland fields was encountered, indicated that the oil region on the Dutch border might, on the right bank of the Ems River, extend much farther to the east than had hitherto been believed.

Drilling plans.—The drilling successes were partly due to the application of modern seismograph units, some of them American, but they could not have been achieved with these investigations alone if an outstanding drilling program had not made it possible to test the structures.

With the help of some 160 drilling rigs a total drilling footage of 981,000 ft. was reached in 1949. This is an 87 per cent increase over the previous year. Forty-two per cent of the holes sunk were wildcats or extension wells. For the current year the producing companies have drawn up a drilling program which reaches a record figure of 1,500,000 ft. As results of the 1949 campaign, the following discoveries can be enumerated.

Ruehlertwist-Ruehlermoor.—At the end of May the exploration well of Wintershall A.G., situated near the Dutch border northwest of Lingen field on a joint concession of C. Deilmann, Gewerkschaft Elwerath, Preussag and Wintershall A.G., successfully tested an extensive anticline structure outlined by reflection seismograph. The initial yield was 45 cu. m. (about 284 bbl.) from the Bentheim sandstone (Lower Cretaceous), depth 2,560 ft. A number of further wells in the neighborhood gave similar results.

On the Deutsche Schachtbau-Gewerkschaft Elwerath concession, which adjoins towards the east, about the middle of August the wildcat Ruehlermoor 1 came in at 2,200 ft. with an initial yield of 20 tons daily (about 140 bbl.) from the Bentheim.

Later wells had even better results. It proved that Ruehlertwist and Ruehlermoor form one deposit, the productive area of which is at least about 2½ miles wide and extend in length over 6 miles in a west-easterly direction. The reserves of this pool have been put by the Geological Research Office at 12.5 million tons, this being the highest individual figure for a German field.

Scheerhorn.—Scheerhorn field, opened by a wildcat of C. Deilmann in October, is the first typical stratigraphic-trap deposit found in Germany. Here, too, the pay is the Bentheim at about 3,700 ft. During the last few months Scheerhorn 1 flowed steadily 20 to 30 tons daily.

As distinct from Ruehlertwist-Ruehlermoor, which is situated in a remote moor area where pipe lines have to be laid, the Scheerhorn well stands near a canal so that the shipping of the oil can be handled without delay.

Suderbruch.—With the discovery at Suderbruch, Gewerkschaft Brigitta (Shell and Jersey Standard) and Deutsche Vacuum Oel A.G. (Soconv-Vacuum) has stimulated new wildcatting in the Hanover area.

Suderbruch is a deep anticline of great extent in an area between Hanoverian salt domes. Three wells have been completed to a depth of about 6,700 to 6,800 ft.

The yields from the Cornbrash (Jurassic) are extraordinarily high in comparison with the neighboring salt-dome fields. In February 1950 production from the three wells amounted to as much as 2,356 tons (about 600 bbl. daily).

Suderbruch reserves are estimated at 3.5 million tons, more than two times those of Wesendorf, the second best Hanoverian field (in regard to reserves). The relatively light Suderbruch crude is of good quality.

Eldingen.—Even though the first productive hole on the Eldingen structure went to water, there seems to be no doubt that Eldingen will become another field of the new, deep anticline type in Hanover. The concession is owned by Gewerkschaft Elwerath. The first well struck the Angulaten sandstone (Liassic) at 5,200 ft. and, before the hole went to water, an initial flow at a rate of 20 c.m. (about 125 bbl.) daily was measured.

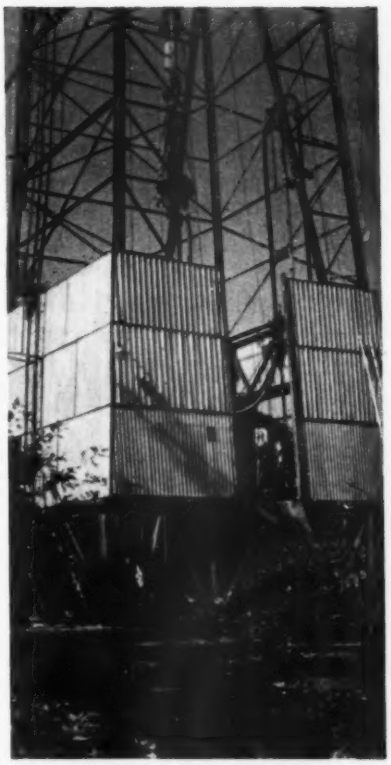
Hohenhorn.—Several miles northeast of the well-known Reitbrook field good oil traces were encountered at Hohenhorn and temporarily even a production of several tons of a heavy crude from the Lower Dogger (Jurassic) could be kept up. The results are not very encouraging. Further drilling is to clarify the situation.

Quakenbrueck.—In early tests oil and gas traces were found near Quakenbrueck in South Oldenburg. The recent Quakenbrueck 5 of Deutsche Vacuum (with 66 per cent participation of Brigitta) for the first time yielded commercial production late in January 1950 from 1,500-1,900 ft. Since then a steady flow of 20 tons daily has been maintained.

Extensions.—In addition to the newly discovered deposits, some new field areas were developed in 1949.

The Heide field group in Schleswig-Holstein was extended towards the south by Holstein-Meldorf 88 of Deutsche Erdoel-A.G. (D.E.A.), which initially flowed 30 cu. m. (about 190 bbl.) of a light crude. The extension is called Elpersbuettel. In Nienhagen-Haenigsen, near the old open tar pits, Kuhlenberg 2 of Elwerath came in. Lastly, C. Deilmann achieved a widening of Weingarten field (Baden) with the successful Werrabronn 3.

Production.—With a total of 841,576 tons (about 16,300 bbl. daily), western German crude production in 1949 was 32.4 per cent above that of the previous year. For the current year



This well, Rodewald WA 400, of Gewerkschaft Brigitta (Jersey Standard and Shell) in the Hanover area of western Germany holds the depth record for Central Europe at 12,631 ft.

an output of at least 1.2 million tons is anticipated, and for the last year of the Marshall plan 1952-53 the estimate is for about 2 million tons. This, together with the production of certain quantities of benzole and shale oil, enables Germany to meet about 40 per cent of her home demand for oil.

The relatively high cost of German crude production has been criticized by Allied observers.

Prior to the war crude in Germany was three times as expensive as in American producing countries. This was due to comparatively small yields per well, a high percentage of failures caused by complicated geological conditions, obsolete equipment, and other factors.

The average price was DM. 120 per ton (about $4.10 a barrel) and was even raised to DM. 160 ($38) per ton in 1948 as a result of increased coal prices, duties, and wages. Since then the price for Emsland crude has been lowered so that the present average price for German crude is about DM. 150 per ton ($5.10 per barrel). A further decrease from higher yields and modernized equipment is expected.

Refining.—In regard to refining, considerable progress was made in the last year. The present topping capacity of the German refineries is nearly 5.5 million tons per year (110,000 bbl. daily). This relatively high efficiency was reached by the utilization of two big hydrogenation plants for the treatment of crude.

The erection of 1.5 million tons additional cracking capacity to handle the residues (no markets for fuel oil worth mentioning exist in the coal country) is recommended by German and OEEC experts, but lack of capital and various other considerations have until now prevented a definite decision as to which projects are to be carried out.

LATIN AMERICA

Illegal Strike

Paralyzing walkout staged by oil workers in Venezuela

A MAJOR part of the Venezuelan oil industry was shut down early this week as a result of a paralyzing political strike of unionized oil workers.

The walkout spread rapidly after it began May 3. More than a million barrels daily of production was closed in, and several refineries were down. Venezuela's output recently has been at about 1,425,000 bbl. daily.

Early this week there were, however, indications that the strike may have run its course. Reports were that back-to-work movements were starting in some areas, and on the basis of advice from Venezuela, one major operator dropped plans to reroute tanker movements.

The government took a firm stand against the walkout, declaring it illegal and blaming communists and the outlawed Democratic Action party for fomenting the trouble. Forty-five oil workers unions were dissolved and their assets forfeited.

What appeared to be a degree of censorship obscured the exact situation. The strike hit particularly heavy in western Venezuela, with all but a small part of this production halted. Although the Shell and Creole refineries on Paraguana Peninsula were reported still running, Creole's Ule pipe line shut down May 5.

Varying percentages of workers were out in most eastern Venezuela fields. Santa Barbara was still producing although refinery construction work at Puerto La Cruz was stopped. Of the three major producers, Shell was virtually shut in, Creole upwards of 75 per cent, and Mene Grande was reported to have only about 15,000 bbl. daily being produced.

Marketing officials expected the strike to be quickly reflected in the East Coast heavy-fuel-oil supply. A large part of the heavy-fuel-oil supply for the eastern United States

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comes from Aruba and Curacao refineries operating on Venezuela crude. The walkout came at a time of low stocks in the east.

The strike was largely political in nature and apparently resulted from a call made in pamphlets distributed on May Day.

The walkout was declared illegal by the Ministry of Labor. The Army was reported patrolling affected areas, and there was no violence. Demands of the workers were said to include, among other items, a return of political exiles by the ruling military junta.

About a month ago the unionized workers threatened to strike to back up their demands on the companies for increased wages and additional commissary privileges. This was headed off with the strong opposition of the government. The operating companies firmly resisted the demands on grounds that the present economic condition of the Venezuelan oil industry made them impossible.

Following this, the Ministry of Labor created a commission to study "in general all aspects related to labor activities in the oil industry which may enable it to establish a correlation between wages and costs of living."

The present strike, however, appeared to be aimed at the government and not the companies. It began at 6:30 a.m. May 3 and later in the day 6,000 workers were reported out. In the next 2 days, many more of the estimated 45,000-50,000 workers had joined in the walkout.

Peruvian Drilling Program

Dunlap & Graham, drilling contracting firm of Long Beach, Calif., has signed a contract with the Peruvian Government for drilling in the government-operated Zorritos area of northern Peru.

Ten wells are to be drilled by the company under the agreement. The contract is reported to be a normal drilling contracting arrangement but with certain guarantees, including payment in dollars.

Zorritos and Los Organos, with production respectively of about 40 and 300 bbl. daily, have been operated by the government since before the war. Last September the government reorganized its oil agency, Empresa Petrolera Fiscal, and assigned it a sizable subsidy. At the time, the government declared its oil operation was hampered by lack of adequate technical plans and faulty organization.

Ball in Venezuela

Max Ball, Washington petroleum consultant and former head of the Oil and Gas Division of the Department of the Interior, is representing Venezuelan oil companies in their current negotiations with the government over a new price base for heavy royalty crude oil.

The government has engaged Walter J. Levy, New York oil economist and former ECA petroleum branch head, to work on the problem. Levy is assisted by W. L. Nelson, technical editor of The Oil and Gas Journal and an engineering professor at Tulsa University.

Creole Petroleum Corp., major Venezuelan producer, last November cancelled its agreement with the government as to the formula for the calculation of the royalty payment. The advisers retained by the companies and the government are understood to be seeking to work out a settlement which may involve an entirely new approach to the royalty price problem.

FAR EAST

Hopeful Wildcat

Oil shows found in eastern India wildcat; Burmah Oil Co. continuing long-term search; new oil regulations issued

Dahl M. Duff

SHOWS of oil have been reported in the Barsilla wildcat which Burmah Oil Co. (India Concessions) Ltd., is drilling in Assam in Eastern India.

The show were obtained in sands at about 4,000 ft., but the company said it is too early to determine if commercial production will be obtained. The well is located in the jungle about 14 miles south of Sibsagar and southwest of Digboi where Assam Oil Co., Ltd., produces India's only production, some 5,500 bbl. daiy.

Burmah Oil, which now wholly owns Assam Oil, has been continuing its long-term search for new sources of production in India, and it was disclosed several months ago that Standard-Vacuum Oil Co. has been making preliminary surveys in the Assam region.

Favorable area.—The eastern Tertiary belt of India appears to contain the most likely prospects for any future oil discoveries. This was brought out recently by J. Coates, senior geologist of Burmah Oil (India Concessions), in giving the presidential address to the section of geology and geography at the meeting of the Indian Science Congress at Poona.

Coates reviewed the history of oil exploration in India, pointing out that there were wells drilling to investigate the oil seeps in Assam only a few years after the Drake discovery in the United States.

He outlined the geology of India, discussing particularly Assam, and said that last year's unsuccessful test at Tiru Hills in the Assam Valley "proved one more example, unfortunately, of a prospect whose potentialities were cancelled out mainly by unpredictably unfavorable underground structure."

The well drilled one of the few anticlinal structures still untested in the Assam Valley region.

New rules.—Pointing up the exploration effort in India, the central government earlier this year placed in effect its new petroleum rules governing exploration and subsequent production. These include a qualified refinery obligation, possible Indian participation in non-Indian companies, and a 10 per cent royalty.

India's new concession rules provide for the issuance by the provincial government of certificates of approval for petroleum. Holders of these can apply for exploration licenses, prospecting licenses, and leases.

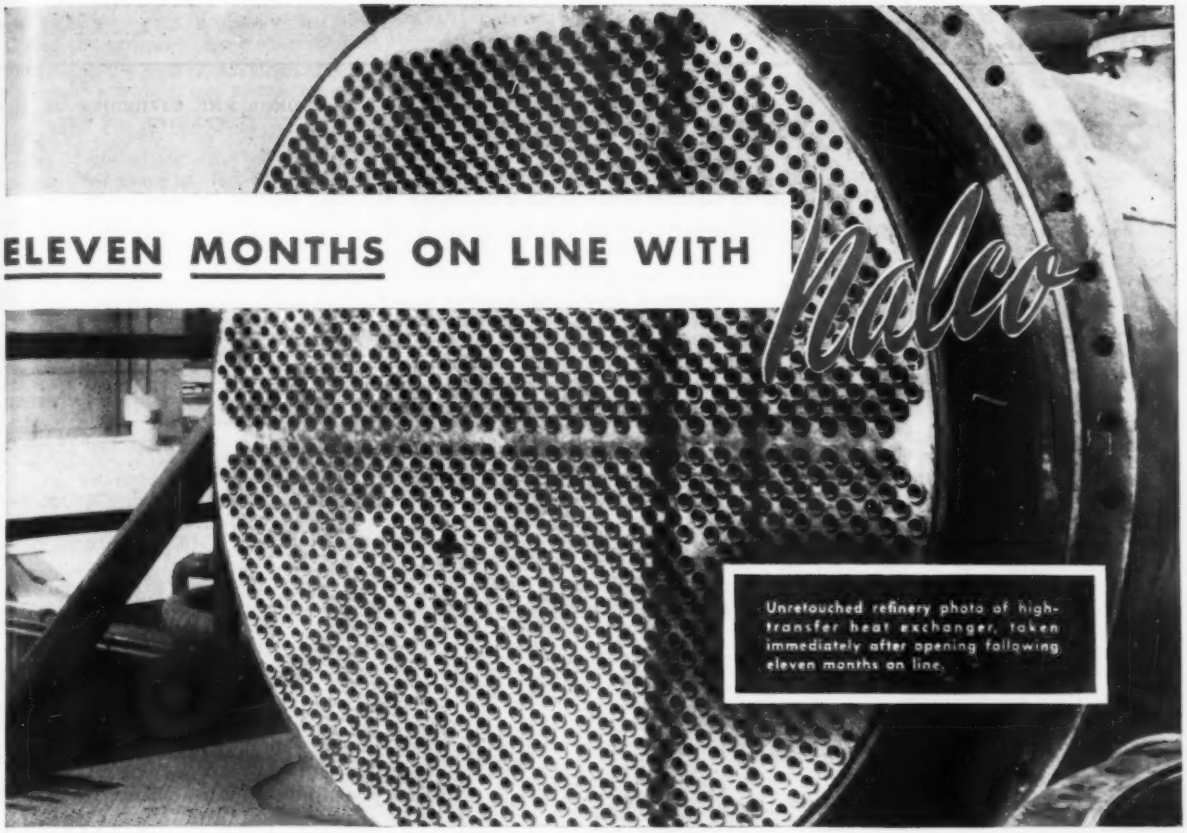
The central government rules set up the conditions under which the licenses and leases are granted by the provincial government with the approval in all cases of the central government. The holder of the exploration license has the exclusive right to a prospecting license, and the holder of a prospecting license, to a mining lease if production is obtained.

The lease is for a maximum 30 years, subject to renewal at the same royalty dead rent, and surface rental for the same period as the original lease. The operator pays dead rent or royalty, whichever is higher. Dead rent is on a graduated scale from 2 to 10 rupees per acre (one rupee of 16 annas is about 21 cents). The royalty of 10 per cent is subject to a minimum of 8 annas per 40 Imperial gallons.

Oil needs.—India's need for the development of additional petroleum resource beyond its present small production is reflected in the studies being made there of the production of synthetic liquid fuels.

Late last month, the Indian president, Doctor Rajendra Prasad, officially opened a National Fuel Research Institute at Digwardiah in Bihar province. The institute will work on the manufacture of synthetic petroleum, among other projects.

India at present produces about 31,000,000 tons of coal annually and imports about 3,000,000 tons (60,000 bbl. daily) of petroleum products.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Second Best in History

Study of 32 companies shows operations and earnings in 1949 exceeded only by 1948; reserves at an all-time high

Presented here is an analysis of the operations of 32 major companies during 1949. The article has been an annual feature of The Oil and Gas Journal and has been prepared this year, as in the past, by F. J. Sansone, for many years a petroleum analyst with Carl H. Pforzheimer & Co., New York.

ALTHOUGH earnings and operations of the petroleum industry in 1949 declined for the first time since the end of the war, last year represented the second best year in the industry's history, being exceeded only by record-breaking 1948.

From the financial standpoint, the outstanding features of 1949 operations as revealed by the annual reports of 32 oil companies were:

1. A decline of 27.4 per cent in net earnings after all charges.

2. An increase of 17 per cent in total cash dividend payments to a new high record.

3. New highs in both total assets and net worth as the companies plowed back into the business 58 per cent of their net earnings.

4. A continued high level of capital expenditures as the industry rounded out its tremendous postwar expansion programs.

5. Average grade crude oil prices held throughout the year and gasoline prices showed only minor changes, but quotations for heavy grades of crude, heating oils, and fuel oil declined substantially.

On the operating side, the industry's activities were featured by:

1. Declines of 8.9 and 4.2 per cent, respectively, in domestic crude-oil production and refinery runs of crude oil.

2. An increase of 24.4 per cent in petroleum imports and a decline of 18.6 per cent in exports.

3. A decline of 0.6 per cent in total petroleum demand as gasoline consumption increased 4.8 per cent to almost offset the substantial declines in fuel-oil demand and oil exports.

4. An all-time high record number of exploratory wells and the second highest total of all wells drilled in any year.

5. Proven reserves of both crude oil and natural gas increased to the highest levels on record.

The accompanying tables present income-account and balance-sheet data of the 32 individual companies for 1949 and 1948 and summarized composite financial statements of the group for the last 3 years.

With combined assets of $17.8 billion, after capital extinguishment reserves of $9.7 billion, these companies constitute the major part of the domestic oil industry and also account for a large share of foreign petroleum operations.

Reflecting the loss of revenues resulting from reduced crude-oil output and lower average petroleum product prices, gross operating revenues of the group in 1949 declined 6.3 per cent to a total of $14,818,131,000, compared with $15,854,029,000 in 1948.

The 32 companies reported aggregate net income of $1,556,463,000 for the year ended December 31, 1949. This represented a decline of $589,679,000 from the all-time record established in 1948 when these companies had combined net income of $2,146,142,000. While 27.4 per cent below 1948, earnings of the group last year

EARNINGS AND DIVIDENDS OF 32 OIL COMPANIES, 1936-1949

	Net income	Cash dividends
1949	$1,556,462,729	$657,643,315
1948	2,146,141,586	562,467,093
1947	1,399,046,359	494,338,248
1946	874,742,847	368,031,713
1945	693,571,485	322,582,396
1944	721,925,607	319,587,936
1943	575,743,793	268,710,428
1942	454,298,222	244,053,844
1941	585,179,611	277,694,030
1940	419,766,401	231,415,557
1939	362,974,010	210,193,197
1938	344,870,763	220,897,683
1937	634,368,549	311,935,027
1936	463,479,894	251,625,745

Comparative Earnings and

	Gross operating income	Net income	Earned per share common	Cash dividends[1]	Dividends paid per share common
Amerada Petroleum Corp.:					
1949	$58,070,160	$14,384,193	$9.12	$7,886,750	$5.00
1948	68,412,953	22,642,252	14.35	9,464,100	6.00
Atlantic Refining Co.:					
1949	446,461,857	27,210,432	9.51	7,233,742	2.00
1948	435,149,546	35,657,124	12.68	7,233,749	2.00
Barnsdall Oil Co.:					
1949	37,433,601	14,852,469	[2]7.96	6,124,853	3.00
1948	37,150,304	14,273,691	[2]6.42	5,558,268	2.50
Cities Service Co.:					
1949	582,560,721	55,057,822	14.87	12,956,566	3.50
1948	563,657,035	65,777,039	17.77	11,105,629	3.00
Continental Oil Co.:					
1949	315,219,913	36,096,880	7.48	19,293,129	4.00
1948	330,280,783	54,216,729	11.24	16,824,254	3.50
Gulf Oil Corp.:					
1949	969,502,768	100,877,041	8.89	42,544,688	3.75
1948	1,068,876,539	153,539,299	13.53	[3]32,333,964	[3]3.00
Houston Oil Co.:					
1949	18,254,932	5,786,727	5.26	2,746,546	2.50
1948	18,344,786	6,092,536	5.54	2,197,236	2.00
Humble Oil & Refining Co.:					
1949	761,128,735	120,479,526	6.70	71,902,720	4.00
1948	1,050,570,401	186,068,579	10.35	71,902,720	4.00
Lion Oil Co.:					
1949	65,605,839	9,115,161	3.89	3,511,186	1.50
1948	66,645,121	11,722,432	[4]5.01	3,218,495	[4]1.37½
Mid-Continent Pet. Corp.:					
1949	130,169,838	12,080,616	6.50	5,570,526	3.00
1948	144,233,483	24,681,993	13.28	6,964,560	3.75
Ohio Oil Co.:					
1949	165,533,916	33,658,767	5.13	15,095,756	2.30
1948	191,385,429	49,333,158	7.52	15,095,763	2.30
Phillips Petroleum Co.:					
1949	486,442,215	44,514,371	7.36	18,142,619	3.00
1948	487,165,287	72,630,997	12.01	18,136,610	3.00
Plymouth Oil Co.:					
1949[5]	41,630,146	6,171,587	5.12	[6]2,290,020	[6]2.00
1948	15,516,554	6,594,656	6.38	[6]1,961,810	[6]1.90
Pure Oil Co.:					
1949	263,388,206	26,977,116	6.22	10,174,437	2.00
1948	281,319,490	41,672,136	9.91	10,174,420	2.00
Richfield Oil Corp.:					
1949	122,961,735	20,434,099	5.11	10,000,000	2.50
1948	118,770,869	16,751,475	4.19	8,000,000	2.00
Seaboard Oil Co.:					
1949	26,689,319	5,781,347	4.71	2,543,446	2.00
1948	28,717,850	6,780,712	5.52	2,458,366	2.00
Shell Oil Co.:					
1949	816,427,534	76,422,775	5.67	40,411,875	3.00
1948	830,421,211	111,396,447	8.27	40,411,875	3.00
Sinclair Oil Corp.:					
1949	584,460,573	54,073,338	4.51	23,943,164	2.00
1948	636,568,727	81,048,602	6.76	23,943,018	2.00

were 11.2 per cent higher than in 1947 and the second highest on record.

Results of the individual companies varied over a wide range. Three members of the group—Barnsdall Oil Co., Richfield Oil Corp., and Standard Oil Co. of Kentucky—reported higher earnings in 1949 than in 1948. Richfield's profits increased 21 per cent as development of its Cuyama Valley discovery resulted in a large increase in company's oil output. Standard of Kentucky and Barnsdall showed gains of 7 and 4 per cent, respectively. The other 29 companies registered declines ranging from 5 to 51 per cent.

In general, companies with production activities heavily centered in Texas showed some of the largest earnings declines. This reflected the sharp curtailment of production allowables in that state and the fact that Texas accounted for almost 90 per cent of the total decline in United States production last year. With well operating costs tending to remain relatively constant regardless of the rate of production, unit costs rise sharply when production is substantially reduced. The net effect of lower production on net earnings, therefore, is considerably greater than the reduction in volume.

COMPOSITE INCOME AND BALANCE-SHEET STATEMENTS OF 32 OIL COMPANIES

Income account—	1949	1948	1947
Gross operating income	$14,818,130,784	$15,854,029,172	$11,726,217,877
Depreciation, depletion, etc.	1,213,191,858	1,187,649,310	941,219,776
Provision for income taxes	438,679,480	791,051,015	479,234,702
Net income	1,556,462,729	2,146,141,586	1,399,046,359
Cash dividends paid	657,643,315	562,467,093	494,338,248
Assets—			
Current assets	$5,611,842,748	$5,710,290,861	$4,817,676,721
Property, plant, and equipment*	10,702,225,574	9,751,127,934	8,200,842,627
Investments and advances	1,374,547,467	1,391,140,462	1,114,064,008
Miscellaneous other assets	177,509,519	206,014,093	220,088,068
Total assets	$17,866,125,308	$17,058,573,350	$14,352,671,424
Liabilities—			
Current liabilities	$1,962,536,105	$2,427,413,169	$1,878,201,672
Funded and long term debt	2,700,551,580	2,327,632,197	1,952,652,926
Preferred stock	213,400,275	216,583,775	202,094,200
Common stock	4,478,929,314	4,398,767,143	4,031,700,024
Capital surplus	1,264,054,028	1,177,260,824	977,965,796
Earned surplus	6,283,365,814	5,500,911,989	4,355,406,782
Other liabilities and reserves	963,288,192	1,010,004,253	954,650,024
Total liabilities	$17,866,125,308	$17,058,573,350	$14,352,671,424
Net working capital	$3,649,306,643	$3,282,877,692	$2,939,475,049

*Net after reserves for depreciation, depletion, etc. amounting to $9,718,513,952 in 1949; $9,084,082,442 in 1948; and $8,406,713,368 in 1947.

Dividends of 32 Oil Companies

	Gross operating income	Net income	Earned per share common	Cash dividends[1]	Dividends paid per share common
Skelly Oil Co.:					
1949	163,502,593	26,186,500	20.04	[7]6,231,439	[7]5.00
1948	180,044,371	38,914,350	36.04	[7]5,152,047	[7]5.00
Socony-Vacuum Oil Co.:					
1949	1,226,698,775	98,329,305	3.09	34,971,291	1.10
1948	1,326,508,385	132,800,055	4.18	[8]31,178,317	[8]1.00
South Penn Oil Co.:					
1949	24,280,163	5,736,461	3.28	3,829,776	2.20
1948	33,739,546	7,910,865	4.59	6,215,683	3.60
S. O. California:					
1949	742,551,413	137,856,477	10.10	[9]54,579,661	[9]4.00
1948	735,789,985	161,491,932	12.42	[9]52,015,812	[9]4.00
S. O. Indiana:					
1949	1,158,124,773	102,668,228	6.72	[10]30,569,564	[10]2.00
1948	1,236,957,533	140,079,286	9.16	[10]32,480,351	[10]2.12½
S. O. Kentucky:					
1949	192,412,372	13,718,318	5.27	7,553,891	2.90
1948	200,334,520	12,856,518	4.94	6,902,692	2.65
S. O. New Jersey:					
1949	2,891,945,130	268,869,501	8.91	[11]119,755,901	[11]4.00
1948	3,300,785,651	365,604,976	12.44	[11]55,899,204	[11]2.00
S. O. Ohio:					
1949	254,758,486	16,142,164	4.26	8,073,712	2.00
1948	245,157,216	23,783,197	6.39	[12]6,635,146	[12]1.62½
Sun Oil Co.:					
1949	462,077,399	25,177,875	4.57	[13]5,351,773	[13]1.00
1948	447,309,191	42,853,839	8.61	[13]4,913,964	[13]1.00
Sunray Oil Corp.:					
1949	58,485,401	10,846,070	1.77	6,928,863	1.00
1948	65,527,181	15,644,234	2.78	6,125,958	0.90
Texas Co.:					
1949	1,077,270,246	132,743,159	9.62	51,692,674	3.75
1948	1,080,886,431	165,980,980	12.03	[14]40,619,469	[14]3.00
Texas Pacific Coal & Oil Co.:					
1949	13,339,899	6,338,753	3.58	3,100,737	1.75
1948	15,539,378	7,461,038	4.21	3,100,679	1.75
Tide Water Associated Oil Co.:					
1949	355,369,087	27,518,705	4.20	10,902,333	1.60
1948	373,499,889	39,387,374	6.04	12,922,983	1.90
Union Oil of California:					
1949	205,353,039	20,353,946	3.69	11,729,677	2.37½
1948	208,353,533	31,293,147	6.51	11,319,951	1.95

(1) Includes dividends paid on common and preferred stocks. (2) Based on 1,865,800 shares in 1949 and 2,223,307 shares in 1948. (3) Also dividend in stock of Texas Gulf Sulphur Co. at rate of 1/65th share per share of Gulf Oil. (4) Adjusted for 2 for 1 stock split in April 1949. (5) Includes 100 per cent Republic Oil Refining Co. after June 1, 1949—previously 50 per cent owned. (6) Also stock dividend of 2 per cent. (7) Also stock dividends of 20 per cent in 1949 and 10 per cent in 1948. (8) Also stock dividend of 2 per cent. (9) Also stock dividends of 5 per cent each paid in January 1950 and January 1949. (10) Also dividend in stock of Standard Oil of New Jersey at rate of 1/100th share per share of Standard Oil of Indiana. (11) Also stock dividends of 2 per cent in 1949 and 5 per cent in 1948. (12) Also stock dividend of 2 per cent. (13) Also stock dividend of 10 per cent. (14) Also stock dividend of 2½ per cent.

Fifteen of the 32 companies paid higher per share cash dividends on their common stock in 1949 than in 1948. As a result, aggregate disbursements to stockholders last year were the highest on record totaling $657,643,000, an increase of $95,176,000 or 17 per cent over the previous record set in 1948. Discontinuance by Standard Oil Co. (N. J.) in the second half of 1949 of its policy of paying part of its dividend in stock accounted for about two-thirds of the increase in the group's total cash dividend payments.

Cash dividends in per cent of net income for the 32 companies increased to 42 per cent from the extremely low ratio of 26 per cent in 1948, when the industry's capital requirements were at a maximum.

Capital expenditures for properties, plant, equipment, and related investments by the 32 companies in 1949 amounted to approximately $2,300,000,000 and compared with a record total of such expenditures of $2,752,000,000 in 1948.

The large capital expenditures of recent years and high replacement costs have affected charges for depreciation, depletion, and amortization to an increasing extent and such charges against earnings have been rising steadily.

Nevertheless, capital extinguishment charges continued to fall far short of providing the funds required for new facilities. The deficiency, which amounted to $1,087,000,000 last year, was met largely by the $898,829,000 of net earnings retained in the business in 1949.

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Comparative Assets, Liabilities, Financial Condition, Capital of 32 Companies

	Total assets	Net property account	Current assets	Current liabilities	Net working capital	Senior obligations*	Common stock and surplus
Amerada Petroleum Corp.:							
1949	$70,294,824	$40,883,360	$26,980,452	$5,636,769	$21,343,683	.....	$62,273,110
1948	70,349,094	32,131,678	35,942,855	12,439,186	23,503,669	.....	55,775,667
Atlantic Refining Co.:							
1949	406,023,515	271,811,844	121,444,248	66,746,575	54,697,673	‡$84,532,054	246,061,216
1948	382,557,612	251,779,652	119,829,602	70,192,791	49,636,811	‡77,888,000	226,084,536
Barnsdall Oil Co.:							
1949	87,271,082	43,476,202	43,168,362	10,352,681	32,815,681	37,000,000	39,913,093
1948†	58,461,750	35,644,835	21,219,909	8,580,307	12,639,602	.....	48,718,276
Cities Service Co.:							
1949	946,363,279	602,853,693	289,270,681	108,728,575	180,542,106	423,944,945	327,386,068
1948	991,851,278	645,485,102	286,116,090	124,248,569	161,867,521	512,082,756	258,132,932
Continental Oil Co.:							
1949	271,293,803	152,660,205	98,433,003	41,332,142	57,100,861	1,427,783	226,795,465
1948	261,949,817	136,635,762	108,025,109	48,673,656	59,351,453	1,475,475	209,973,714
Gulf Oil Corp.:							
1949	1,215,890,766	693,655,122	347,987,255	142,139,402	205,847,853	189,969,415	832,570,428
1948	1,191,004,087	658,524,271	393,348,098	179,891,636	213,456,462	184,874,046	765,729,137
Houston Oil Co.:							
1949	60,835,461	44,368,994	10,066,274	3,133,732	6,932,542	8,700,000	49,001,729
1948	59,533,197	42,689,507	10,399,302	4,471,648	5,927,654	9,100,000	45,961,548
Humble Oil & Refining Co.:							
1949	854,875,082	631,071,368	220,125,725	81,938,325	138,187,401	50,534,013	722,122,487
1948	861,426,325	560,663,995	297,315,358	138,231,697	159,083,661	49,491,900	673,545,681
Lion Oil Co.:							
1949	75,126,443	50,527,225	22,275,408	8,753,263	13,522,145	25,000,000	41,373,180
1948	63,875,852	38,091,038	24,422,882	8,106,597	16,316,285	20,000,000	35,769,254
Mid-Continent Petroleum Corp.:							
1949	136,196,505	73,063,922	61,683,981	15,359,637	46,504,344	.....	112,394,209
1948	137,145,572	65,371,738	70,652,666	22,833,405	47,819,261	.....	107,798,232
Ohio Oil Co.:							
1949	213,570,923	121,033,046	73,075,846	20,991,407	52,084,439	.....	192,377,015
1948	203,389,193	111,654,130	73,433,472	29,380,500	44,052,972	.....	173,814,004
Phillips Petroleum Co.:							
1949	607,228,507	429,938,398	155,694,230	68,394,888	87,299,342	111,719,146	416,034,119
1948	579,273,529	395,573,350	151,348,708	78,537,608	72,811,100	99,793,245	387,253,055
Plymouth Oil Co.:							
1949§	53,489,873	35,792,395	17,187,934	8,758,811	8,429,123	14,685,360	27,826,076
1948	25,146,909	18,126,383	5,013,668	2,562,883	2,450,785	4,139,902	17,663,536
Pure Oil Co.:							
1949	289,287,674	196,085,492	84,506,183	26,272,613	58,233,570	‡72,609,721	183,846,007
1948	270,967,853	181,984,681	81,624,545	23,928,211	57,696,334	‡74,909,223	167,043,328
Richfield Oil Corp.:							
1949	181,746,420	92,927,181	83,946,073	19,282,300	64,663,773	50,000,000	112,261,472
1948	146,993,584	72,552,381	68,819,581	19,963,564	48,856,017	25,000,000	101,827,373
Seaboard Oil Co.:							
1949	30,535,926	13,988,136	13,953,406	3,440,631	10,512,775	.....	26,630,181
1948	28,553,007	13,028,978	13,263,098	4,972,559	8,290,539	.....	23,215,994
Shell Oil Co.:							
1949	643,595,888	343,920,204	255,437,915	109,049,483	146,388,432	120,672,000	413,874,405
1948	640,568,987	333,981,804	269,503,505	140,908,452	128,595,053	121,797,000	377,863,514
Sinclair Oil Corp.:							
1949	724,047,907	418,045,905	282,218,631	89,548,511	192,670,120	182,410,088	441,899,280
1948	710,125,230	387,116,078	296,157,588	108,234,893	187,922,695	179,588,687	411,769,520
Skelly Oil Co.:							
1949	182,923,734	140,489,953	40,407,604	20,675,194	19,732,410	14,000,000	147,782,684
1948	169,015,454	109,483,085	57,784,118	25,937,411	31,846,707	14,800,000	127,827,652
Socony-Vacuum Oil Co.:							
1949	1,472,342,669	771,397,675	441,903,970	156,671,870	285,232,100	174,500,000	1,086,535,462
1948	1,443,034,000	732,890,440	454,814,387	184,427,873	270,386,514	175,000,000	1,023,177,448
South Penn Oil Co.:							
1949	48,087,562	15,572,135	14,225,272	3,184,217	11,041,055	1,000,000	37,224,624
1948	50,656,772	9,142,211	14,601,367	8,003,660	6,597,707	2,727,823	34,564,872
S. O. California:							
1949	1,157,703,362	772,735,397	341,480,019	103,621,460	237,858,559	140,235,048	892,157,603
1948	1,074,525,652	689,503,058	285,641,998	113,790,504	171,851,494	107,217,702	810,719,429
S. O. Indiana:							
1949	1,550,898,031	1,022,452,070	414,330,594	145,066,940	269,263,654	286,946,517	1,083,343,199
1948	1,500,049,488	975,759,328	395,835,562	198,316,476	197,519,086	249,464,586	1,018,721,446
S. O. Kentucky:							
1949	79,991,295	33,349,637	40,990,031	20,649,182	20,340,849	.....	58,542,113
1948	76,938,402	29,957,855	41,683,106	23,760,716	17,922,390	.....	52,377,686
S. O. New Jersey:							
1949	3,816,044,661	2,085,721,726	1,246,682,287	399,417,683	847,264,604	475,710,293	2,327,241,729
1948	3,526,043,348	1,858,675,283	1,184,288,351	524,449,625	659,838,726	225,097,887	2,165,101,347
S. O. Ohio:							
1949	233,962,621	128,821,813	97,372,696	39,051,223	58,321,473	‡61,133,089	132,647,563
1948	237,389,473	112,937,258	117,173,047	50,033,367	67,139,680	‡61,549,040	124,521,152
Sun Oil Co.:							
1949	295,703,249	183,879,729	102,670,207	46,399,461	56,270,746	‡15,319,700	231,633,244
1948	278,582,552	159,135,242	110,572,576	54,159,533	56,413,043	‡10,149,194	211,807,142
Sunray Oil Corp.:							
1949	131,460,293	99,112,866	28,916,122	9,573,183	19,342,939	‡69,780,675	51,000,483
1948	136,030,805	93,912,442	38,134,797	13,318,915	24,815,882	‡74,679,675	46,878,048
Texas Co.:							
1949	1,368,132,586	742,058,255	443,586,065	122,397,921	321,188,144	180,128,777	1,030,984,874
1948	1,277,093,761	623,009,802	481,202,868	124,046,017	357,156,851	164,208,610	953,999,405
Texas Pacific Coal & Oil:							
1949	28,492,615	22,856,957	5,543,448	1,426,961	4,116,487	.....	26,959,635
1948	26,220,368	18,957,362	7,181,654	2,392,592	4,789,062	.....	23,721,619
Tide Water Associated Oil:							
1949	295,161,255	176,302,398	99,355,589	36,468,792	62,886,797	18,038,231	231,806,672
1948	287,730,301	168,523,625	101,902,932	47,194,876	54,708,056	20,299,221	215,304,232
Union Oil of California:							
1949	347,547,497	249,372,269	86,743,237	28,072,274	58,670,963	‡103,955,000	213,849,711
1948	298,415,903	194,501,941	96,038,062	31,403,442	64,634,620	‡78,900,000	186,604,202

*Long term debt and preferred stock. †Restated for comparative purposes. ‡Includes preferred stock. §Includes 100 per cent Republic Oil Refining Co. after June 1, 1949.

PERSONALS

Veteran Refiner

Cooper manager of Pure's Smiths Bluff refinery

C. W. COOPER, manager of Pure Oil Co.'s Smiths Bluff refinery and the company's new $20,000,000 lubricants plant at Nederlands, Tex., has a background of 17 years service with Pure.

A graduate of Lawrence College, Cooper took postgraduate courses in chemistry and chemical engineering at the University of Minnesota and the University of Wisconsin. In 1936 and 1937 he was chief chemist of the Smiths Bluff refinery, which is Pure's largest. In 1941 he was assistant general operating foreman of the refinery, and in 1948 was promoted to manager of the plant.

During his service with Pure, Cooper has been assistant superintendent of the Cabin Creek refinery near Charleston, W. Va.

Active in civic, industry, and professional groups, Cooper is a member of the American Chemical Society, the American Petroleum Institute, and is a past president of the West Virginia Petroleum Association.

Joe E. Graham, district petroleum engineer for Humble Oil & Refining Co. at Grand Isle, La., has been transferred to New Orleans as senior petroleum engineer.

B. B. Howard, director of Standard Oil Co. (N. J.), New York, has been elected to the board of directors of the Transportation Association of America.

J. S. Leonard, district superintendent of offshore operations for Ohio Oil Co. at Freeport, Tex., has been transferred to Midland, Tex., as district superintendent of the Houston-New Mexico division, in charge of drilling.

Roger L. Messman, assistant division geologist for Continental Oil Co., Ponca City, Okla., has resigned and has become associated with **William Graham,** Wichita independent oil operator. Messman joined Continental in 1936.

W. B. Burklin, district civil engineer for Humble Oil & Refining Co. at Katy, Tex., has been transferred to the Tomball, Tex., production district in the same capacity.

C. J. Hurst, Tulsa, was recently elected a director of Three Rivers Refinery, Three Rivers, Tex., filling the vacancy on the board caused by the death of A. F. Boudreau.

Karl Buehler, formerly geologist with J. M. Huber Corp., has opened offices in Wheatridge, Colo., as a consultant.

Pete Cawthon, formerly reservoir engineer with Phillips Petroleum Co. at the firm's Midland, Tex., division office, has left that company to take a position as a reservoir engineer with the City National Bank of Houston.

Donovan P. Dugan, superintendent and a manager of Tuscarora Oil Co., Ltd., Harrisburg, Pa., has been elected vice president of the firm. He has been with Tuscarora since 1931 and has served as engineer and assistant superintendent. He will continue his duties as superintendent.

M. E. Markley, production and drilling foreman at Stonewall, Okla., for Magnolia Petroleum Co., has been transferred in a similar capacity to County Line, Okla.

S. G. Edwards, general superintendent, Houston, and **E. K. Bissett,** district superintendent, Beeville, for Houston Oil Co. of Texas, have resigned to form Newton Drilling & Well Servicing Co. with headquarters at Conroe, Tex.

Dan S. Moore, Esso Standard Oil Co., Baton Rouge, has gone to Caracas, Venezuela, to become salary administration supervisor for the Creole Petroleum Corp., an affiliate of Esso.

Paul J. Shanor, petroleum engineer for Phillips Petroleum Co., has been transferred from Odessa, Tex., to Shidler, Okla., where he will assume reservoir-engineering duties.

R. D. Menefee, geologist for Shell Oil Co. at Jackson, has been named district geologist. Other changes include: **D. A. Schmeeckle,** mechanical engineer, New Orleans, transferred to Donaldsville, La.; **J. K. Larsen,** geologist, Baton Rouge, appointed district geologist; **R. P. Haddox,** junior exploitation engineer, Houston, transferred to Franklin, La., as exploitation engineer; **E. K. Domingos,** junior mechanical engineer, Houston, transferred to the Lake Charles division as mechanical engineer; **H. R. Burkhart,** mechanical engineer, Donaldsville, transferred to New Orleans; **W. L. Lorette,** production foreman at Donaldsville, transferred to Lake Charles in the same capacity; **L. D. Reynolds,** production foreman, Lake Charles, transferred to Donaldsville in the same capacity; and **R. F. Story,** geologist, Baton Rouge, transferred to Lake Charles.

Perry J. Sweeny, Texas City, Tex., has been elected chairman of the board of Pan American Pipe Line Co., and **Ira O. Walker,** Houston, has been named president. Sweeny, a graduate of the University of Illinois, joined Standard Oil Co. (Ind.) as a draftsman in 1916. He was appointed superintendent of light oils in 1923 and in 1928 became assistant general superintendent of the refinery at Whiting, Ind. Joining Pan American Refining Corp. in 1933 as plant manager at Texas City, Sweeny was elected vice president of the firm in 1945 and 2 years later became first vice president. Walker, who attended the University of Colorado, formerly was with Lago Petroleum Corp. in Maracaibo, Venezuela. He joined Shell Oil Co. in South Louisiana in 1935, and in 1936 went with Pan American Production Co., becoming district superintendent in 1937. He was named general superintendent in 1944 and in 1947 was appointed vice president and general manager.

P. J. SWEENY

I. O. WALKER

R. A. Stehr, chief geologist of the Mid-Continent division, Seaboard Oil Co. of Delaware, has been made manager of the company's exploration department. Stehr will also retain the title of chief geologist. **J. W. Rawley,** formerly assistant manager of the

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PERSONALS

land department, has been made manager of the department, and **H. B. Lovejoy,** assistant secretary of Seaboard, has been made personnel manager and office manager, in addition to his other duties.

R. T. Colquette, general manager of Pan-Am Southern Corp.'s El Dorado, Ark., refinery, was recently elected to the board of directors, and **Robert L. Aycock,** director and a member of the executive committee, has been named a vice president. Colquette, a graduate of Louisiana State University in Chemical Engineering, joined Root Petroleum Co. as engineer at the El Dorado refinery, became general manager of manufacturing in 1946 and a vice president in 1948. Aycock, who attended Mississippi State College, joined Root Petroleum Co. in 1925. He became vice president of sales and traffic in 1946 and in 1948 was elected a director.

R. T. COLQUETTE

Milton R. Beychok, Long Beach, Calif., has joined Rothschild Oil Co., Santa Fe Springs, Calif., as chief chemist. Formerly with General Petroleum Corp. at its Torrance, Calif., refinery, Beychok, a graduate of Texas A. & M. College, also worked as a research chemical engineer for Shell Oil Co.

William H. Merrit, Chicago, vice president of Cities Service Oil Co. (Del.) and manager of its marketing department, has retired after serving with the firm for 48 years.

Lester F. Danforth, petroleum engineer and at present director of conservation and production for Arkansas Oil and Gas Commission, El Dorado, is resigning May 31 and will move to Tulsa.

Norman R. McKee, vice president of Southern Counties Gas Co. of California, Los Angeles, has retired from the company after more than 35 years of service.

James Kewley, associated with Shell Petroleum Co., Ltd., for more than 34 years, was recently awarded an honorary fellowship of the Institute of Petroleum in London, highest award given by the institute.

Robert G. Carr, San Angelo, Tex., oil operator, will resign July 1 as field representative for Texas Pacific Land Trust, a position he has held since 1926, and will devote full time to his own business.

O. Spooner, veteran of more than 30 years of service in oil operations in Venezuela, has retired from Creole Petroleum Corp. and will reside in Caracas.

William R. Bowles, formerly civil-engineering instructor at Oklahoma A. & M. College, Stillwater, has joined Phillips Oil Co. in Caracas, Venezuela, where he has been assigned to the civil-engineering department of the firm's San Roque camp.

John G. Pew, president of Sun Shipbuilding & Dry Dock Co., has resigned from the company and has been succeeded by **Richard L. Burke,** vice president.

Warren J. Jackson, formerly with Lane-Wells Co., Dallas, has joined Greenbrier Oil Co., Fort Worth, as consulting petroleum engineer.

Warren J. Souder, geologist for The Texas Co. at Casper, Wyo., has been transferred to Craig, Colo., in that capacity.

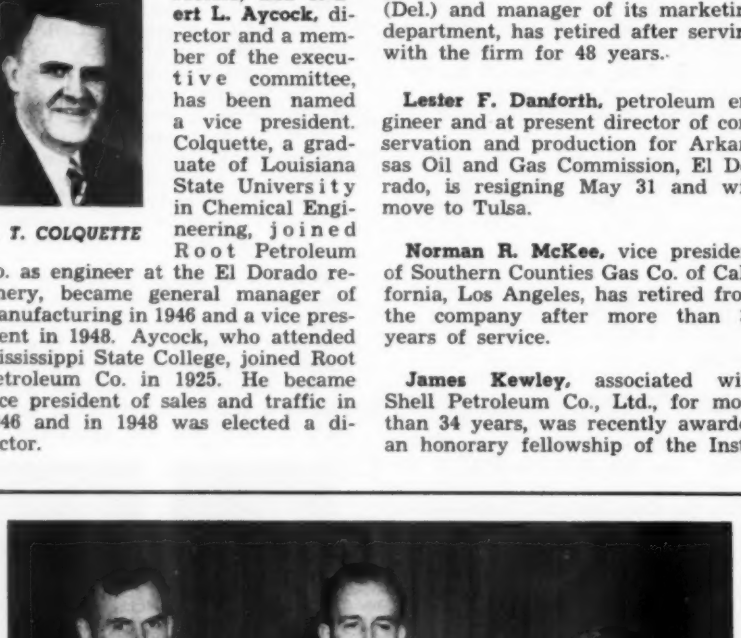
J. L. Jones has been named manager of the Shreveport district, United Gas Pipe Line Co.

Walter Shute has been named manager of the Mexico City office of Kerr-McGee Oil Industries, Inc., which is in charge of drilling for Mexican American Independent Oil Co.'s program in Mexico.

C. E. Loomis, engineer for Columbia Gas Systems, Inc., has been named to the newly created position of assistant vice president. He joined Columbia Gas as a statistician for one of the operating companies, and has been on the engineering staff in the New York office since 1945. He will serve as chief assistant to George S. Young, executive vice president.

Howard Casey, geologist for General Petroleum Corp. at Worland, Wyo., has been transferred to Casper, Wyo.

W. H. Stueve, vice president of Oklahoma Gas & Electric Co., will retire in the summer and will open consulting offices in Oklahoma City for work with the oil and gas industry.



EXECUTIVE COMMITTEE.—Members of the executive committee of Society of Exploration Geophysicists, who were elected at the Chicago convention. Front row, left to right, Andrew Gilmour, Amerada Petroleum Corp., Tulsa, past president; and George E. Wagoner, Carter Oil Co., Shreveport, president. Back row, left to right: Francis F. Campbell, Amerada Petroleum Corp., Tulsa, secretary-treasurer; Richard A. Geyer, Humble Oil & Refining Co., Houston, editor; and Sigmund Hammer, Gulf Research & Development Co., Pittsburgh, vice president.

E. O. Veselka, engineer at Refugio, Tex., for Union Producing Co., has been transferred to Pettus, Tex., in the same capacity.

J. B. Howell, formerly with Stanolind Oil & Gas Co., is now supervising production operations in the San Juan basin for Delhi Oil Corp., with headquarters in Farmington, N. M.

Edwin F. Marker, geologist for Phillips Petroleum Co. at Great Falls, Mont., has been transferred in the same capacity to Malad City, Idaho.

Dorsey Hager, consulting geologist formerly of Centralia, Ill., has opened offices in Salt Lake City.

SHIFTS

John H. Eppard, engineer, Stanolind Oil & Gas Co., Tulsa to Olmito, Tex.; **Richard W. Hillyer,** engineer, Carter Oil Co., Tulsa to Shreveport; **Robert I. Plomert,** engineer, Macrate Oil Co., Long Beach to San Gabriel, Calif.; **C. R. Pierce,** Union Oil Co. of California, Midland to Odessa, Tex.; **W. A. Robertson,** engineer, Atlantic Refining Co., Odessa to McCamey, Tex.; **Fred M. Springer,** engineer, Magnolia Pipe Line Co., Seminole to Snyder, Tex.; **Thompson Reid,** engineer, Sohio Petroleum Co., Centralia, Ill., to Independence, Kans.; **G. A. Nelson,** geologist, The Texas Co., Craig to Denver, Colo.; **Merle H. Rahmes,** engineer, Stanolind Oil & Gas Co., Tulsa to Odessa, Tex.

George H. Haley, engineer, Stanolind Oil & Gas Co., Springhill, La., to Texarkana, Ark.; **R. K. Epps,** engineer, Hycalog Co., Franklin, La., to Jasper, Tex.; **W. L. Effinger,** superintendent, the California Co., Lexington, Ky., to Williamsport, Pa.; **M. P. Drummond,** engineer, Colorado Fuel & Iron Corp., Derby, Colo., to Denver; **R. H. Freeman,** superintendent, Delta Drilling Co., Rock Springs to Lyman, Wyo.

M. W. Maret, engineer, Carbide & Carbon Chemical Corp., So. Charleston to St. Albans, W. Va.; **James M. Gaffney,** superintendent, Lowell & Gist, Inc., Scotts Bluff, Neb., to Casper, Wyo.; **Jim C. Curry,** engineer, Cities Service Oil Co., Oklahoma City to Odessa, Tex.; **D. D. Christner,** geologist, Continental Oil Co., Houston to Fort Worth; **G. H. Zwiebel, Jr.,** National Geophysical Co., Inc., Big Lake to Abilene, Tex.; **M. C. Womack,** superintendent, Kerr-McGee Oil Industries, Inc., Freeport to Newton, Tex.; **Robert R. Shaffer,** engineer, Stanolind Oil & Gas Co., Levelland to Odessa, Tex.; **Jerry McAfee,** engineer, Gulf Oil Corp., Port Arthur, Tex., to Oakmont, Pa.; **H. F. Thompson,** Atlantic Refining Co., Sweetwater to Hamlin, Tex.; **George J. Visconty,** engineer, Socony-Vacuum Oil Co., Inc., Clarksboro to Woodstown, N. J.; **Fred R. Walser,** engineer, Atlantic Refining Co., Upper Darby, Pa., to Port Arthur, Tex.; **Elmer T. Musselman,** geologist, Shell Oil Co., Pueblo, Colo., to Emporia, Kans.; **Wilson Lee Newell,** geologist, Stanolind Oil & Gas Co.; Emporia to Topeka, Kans.; **Leslie B. Riggins, Jr.,** superintendent, Seminole to Oklahoma City.

Billy J. Langford, engineer, Shell Oil Co., Centralia, Ill., to New Iberia, La.; **Arnold F. Lewis,** superintendent, Clemens Exploration Co., Princeton, Ind., to Ludington, Mich.; **M. E. Bass,** Continental Oil Co., Marietta, Ohio, to Tahoka, Tex.; **A. R. Rescorla,** chemist, Cities Service Research & Development Co., New York to Hillside, N. J.; **Roy A. Payne,** geologist, Gulf Oil Corp., Pittsburgh to Houston; **Bruce W. Emerson,** engineer, Baroid Sales Division, National Lead Co., Lewiston, Mont., to Casper, Wyo.; **E. P. Bowler,** engineer, Phillips Petroleum Co., Shidler, Okla., to Chanute, Kans.; **A. C. Austin,** engineer, Ohio Oil Co., Tulsa, to Saskatoon, Sask., Canada; **Howard Halff,** engineer, The Texas Co., Tulsa to Fort Worth.

N.G.A.A. OFFICERS.—Officers of the Natural Gasoline Association of America, photographed at the president's luncheon: William F. Lowe, executive secretary of the N.G.A.A.; Albert H. Weil, United Gas Pipe Line, vice president; James E. Pew, Sun Oil Co., president; T. L. Taggart, Standard Oil Co. of California, vice president; F. M. Perry, Cities Service Co., vice president; and John F. Lynch, La Gloria Corp., vice president.

DEATHS

Milton Hall Eames, 63, assistant secretary of Standard Oil Co. (N. J.) from 1913 until his retirement in 1944, died May 4 in Leonia, N. J. He had also served as a director of Standard Oil Co. of Brazil and secretary of Creole Petroleum Corp., Standard Oil Development Co., and what is now Esso Standard Oil Co.

Francis X. Anglim, former vice president of Atlantic Gulf Oil Corp., died May 2 in New York.

Earle T. Berryhill, 47, Sapulpa, Okla., oil operator, died May 4.

Bert F. Allen, 71, Fort Worth, production superintendent for Snowdon & McSweeney Oil Co., died May 4.

Orlan Lo..is Harmon, 70, independent oil operator, died in Tulsa May 3.

Rex Belisle, 49, prominent Oklahoma City oil attorney who was active in the Interstate Oil Compact Commission, died in Hattiesburg, Miss., May 7, while en route to Oklahoma City from the recent compact meeting in Biloxi, Miss.

Edward L. Morend, 61, pipe-line superintendent for Mexican Gulf Oil Co. in Tampico,, Mexico, died April 27.

Mrs. Vina Bagley, 77, Odessa, Tex., Permian basin oil operator, was killed in an automobile accident May 2.

John M. Tussey, 70, Oil City, Pa., secretary-treasurer of Southern Pipe Line Co., died April 30.

Dr. William R. Dougan, independent oil producer, died recently in Somerset, Pa.

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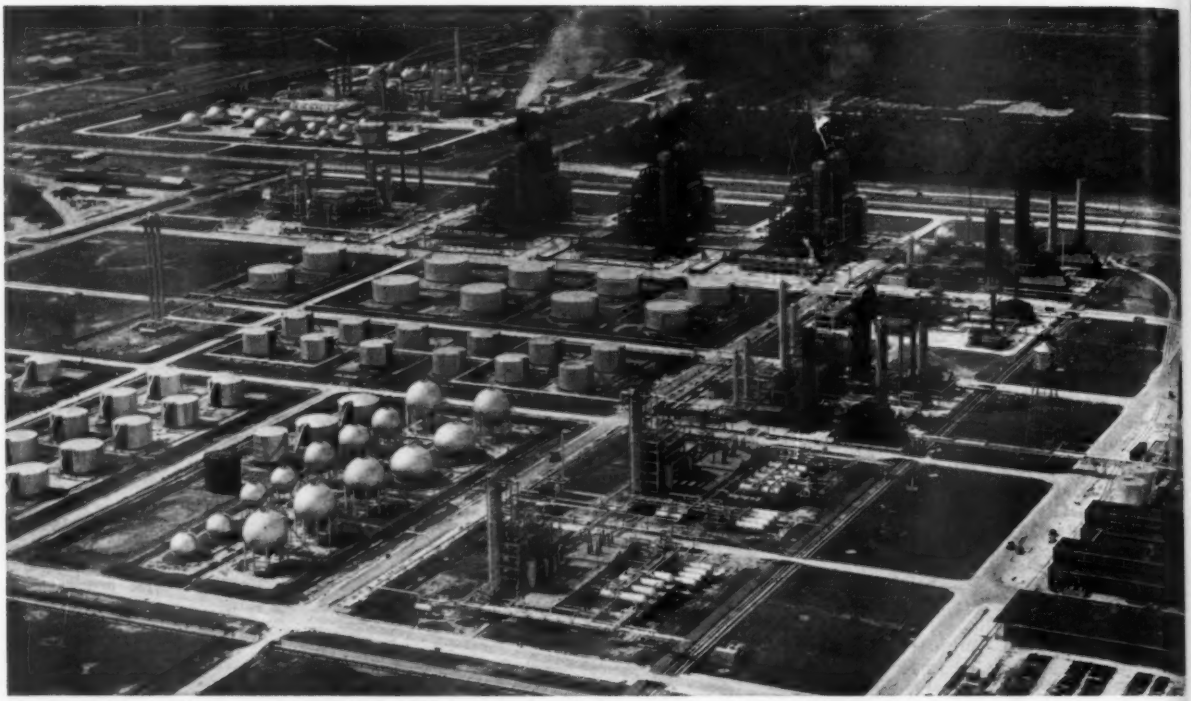


This aerial view of the Cities Service Lake Charles refinery shows new crude-topping facilities added since the war (right). In the background is the butadiene plant now in partial operation, and at the far left is a portion of the Firestone plant which converts butadiene to rubber. The Cit-Con plant, not shown, processes a reduced-crude fraction from the basic refinery for manufacture of a full line of lubricating oils.

War-Products Plant Adapted To High Distillate Yield

by George Weber
Refining Editor

COMPLETED 6 years ago as a major war-products plant, the Cities Service Refining Corp. Tutwiler refinery at Lake Charles represented one of the most extensive construction projects undertaken in any industry. The $75,000,000 super plant was designed specifically to produce high yields of aviation gasoline and butadiene at the earliest possible date.

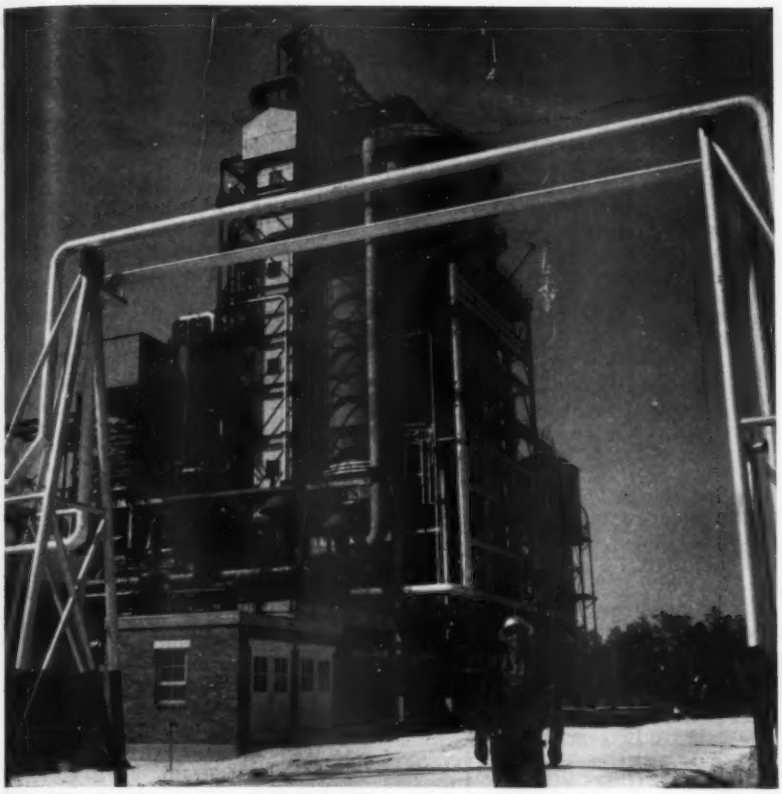
This urgent wartime role was fulfilled. The plant reached a peak production of 25,000 bbl. per day of aviation gasoline blended from alkylates and base stocks. Butadiene at the rate of 55,000 tons annually was produced to meet urgent military requirements for synthetic-rubber manufacture. With this performance record the plant amply achieved the ends for which it was designed by company engineers and by M. W. Kellogg Co., principal contractor.

In early 1944, the Tutwiler refinery, Lake Charles, La., was first placed onstream by Cities Service Refining Corp. It represents the largest domestic installation of its kind ever constructed from "scratch." From its important wartime role, described in detail in The Oil and Gas Journal, July 6, 1944, the plant has been converted to a balanced peacetime operation. The many changes and additions required by postwar fuel demands are here described.

At the close of the war the specialized plant faced an uncertain future. The shape of postwar demand, particularly in distillate fuels, was then not foreseen. However, as the unprecedented market for distillates developed, the company gradually converted operations to conform to a doubled distillate yield. This substantial shift in the gasoline-distillate fuel ratio was primarily responsible for an expansion of total plant capacity well beyond any early postwar expectations.

The general reduction in severity of processing operations permitted a basic increase in total plant throughput. Crude runs were further augmented by a succession of bottleneck removals. These engineering problems involved the addition of some units and items of equipment, and the conversion and relocation of other facilities in the refinery. Incorporation of the Cit-Con operation constituted an additional boost to gross crude processing capacity.

The expansion from a wartime crude capacity of 80,000 bbl. per day to the present peak of 140,000 bbl. daily thus resulted basically from the



This fluid catalytic cracking unit, one of three at the Tutwiler refinery, has been adapted to postwar operations which maximize distillate fuel production. Milder processing conditions have permitted an important increase in crude throughput through the refinery.

revision of operations to produce high distillate yields. It was made possible by a practical program of sound engineering which has adapted plant runs to meet an unanticipated situation in petroleum product demand.

The effect of high distillate demand on the refinery's postwar expansion is illustrated by the fact that today, distillate fuels comprise about 30 per cent based on crude charge, whereas the design distillate yield amounted to only 15 per cent. Any reduction in distillate yield would directly affect the over-all crude-processing capacity of the refinery.

Original War Plant

Originally the plant comprised the following major units:

1. Two identical 40,000-bbl. per stream day crude-topping units with a common straightrun fractionation section processing combined overhead streams.

2. Three fluid catalytic cracking units, each with primary fractionation columns and a common light-ends - recovery or cat fractionation section.

3. A propane deasphalting unit for separating a high-carbon asphalt fraction from topped crude.

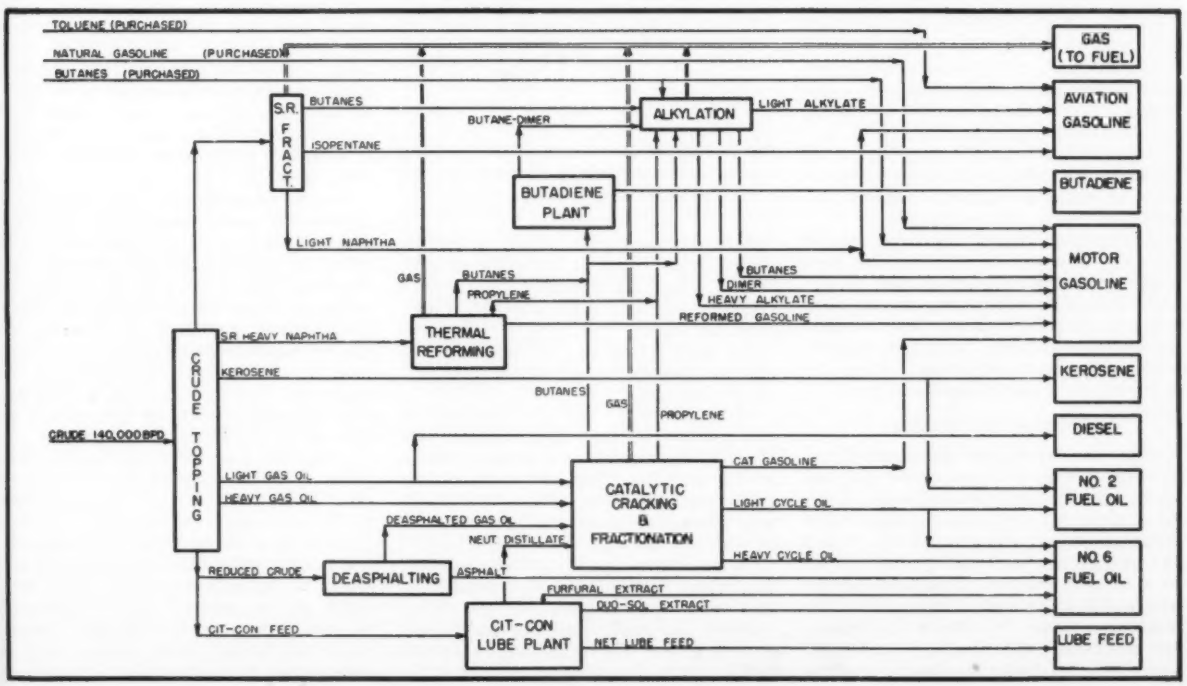
4. A combination thermal reformer and heavy cat cycle oil cracking unit.

5. Two cold sulfuric acid alkylation units converting butylenes and pentenes.

6. A butane isomerization unit operating in conjunction with the alkylation facilities.

7. A butadiene plant serving an ad-

Fig. 1—This block flow diagram represents a typical operation now in effect. The yield of distillate fuel has doubled since wartime, due to the unprecedented market demand.



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jacent rubber-copolymerization plant.

8. Five centralized treating units and sulfuric acid regeneration plant.

9. The necessary auxiliary facilities including power plant, control and research laboratories, pilot-plant laboratory, offices, shops, storage, and dock for barges and ocean-going tankers on the adjacent Calcasieu River.

Many of these units have been adapted to changed operations, and some have been totally or partially converted to new uses. Due both to the modern processes incorporated in the refinery, and to the absence of obsolete units carried over from earlier days, the new plant probably provides the greatest flexibility of any major refinery in this country. This is evidenced by the extremely low yield of residual fuel which can be maintained without resorting to coking operations.

The general over-all operation of the refinery today is illustrated by the accompanying block flow diagram (Fig. 1). This chart reflects present operations for maximum distillate production. As compared with the severe operation which existed originally, this schedule represents the mild extreme permitting maximum crude throughput.

Crudes

Of the 140,000 bbl. which the revamped refinery is capable of processing daily, about 72,000 bbl. is delivered by pipe line from New Mexico, Texas, Louisiana, and Arkansas. The remaining stocks reach the plant by barge. Altogether, crudes from 50 to 60 different fields, mostly in South Louisiana, are received at Lake Charles. They comprise all types, including sizable quantities of sour crudes added since the war.

On receipt, each crude or crude mix is sampled, analyzed, and evaluated. First, those crudes showing suitable lubricating-oil fractions are segregated and run to special tanks to be processed for Cit-Con, this volume running as high as 80,000 bbl. daily.

The remaining crudes are divided roughly into sweet and sour for separate processing. Good aviation naphtha coastal crudes may be further segregated. Any extremely naphthenic crudes are added, together with slop, to sour stocks since no kerosine is made from that mix.

Topping Operations

The two original topping units, termed A and B, have been stepped up to total throughput and augmented by a third which can be used in conjunction with either unit. A third crude-topping unit designated as C unit, was assembled from equipment at Lake Charles and from an affiliated shutdown plant in North Louisiana. In addition, the thermal reformer can be switched to crude topping when necessary during turnarounds of any of the regular crude units.

Gross throughput capacity for the modified and added units now totals about 140,000 bbl. per stream day, as compared with the 70,000 to 80,000-bbl. capacity of the original refinery. Breeching and damper changes were made in A and B furnaces giving more streamlined flow and allowing greater heat input to circulating crude. This modification afforded an over-all increase of about 12 per cent in capacity.

Charge rates in both units were

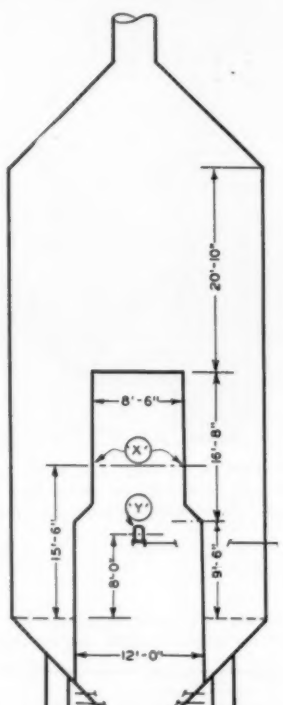

Fig. 2—This stripper design in the C cat unit reactor allows the unit to be operated over a wide range of catalyst bed levels.

further increased by lowered outlet-temperature requirements. The A unit which runs exclusively on crudes selected for the lube content, operates at lower coil outlet temperatures than formerly (595°-625° F.), to prevent any cracking of the reduced crude fraction.

The B unit, which alternately charges sweet and sour crudes on blocked operation, also must operate at lower coil outlet temperatures to minimize corrosion. Since the unit was placed on sour crude, operators have lined the lower section of fractionator with alloy to assure safe operation. Some alloy was placed in the very top section of the fractionator to minimize corrosion and permit lower top temperature operation.

A used polyform furnace from another refinery was installed to operate with either of the two original furnaces. Thus, A unit can process 70,000 bbl. per stream day with one furnace and 80,000 bbl. using the auxiliary furnace. The B unit, when charging West Texas or other sour crudes, can handle 60,000 bbl. alone or 70,000 bbl. with both furnaces. On sweet crudes, capacity averages 55,000 bbl. alone and 65,000 bbl. using the odd furnace.

Desalting Added

Another factor in increasing over-all crude throughput by extending on-stream time, was the installation of two new desalting units ahead of the two crude stills. These became necessary with increased throughput, and permit more severe operation of the crude units when necessary. They remove 92-95 per cent of salt present in feed stock, and the remainder is removed before cracking, in the propane deasphalting unit which formerly performed all desalting.

The C unit has a maximum capacity for 24,000 bbl. per stream day and operates normally at 20,000 bbl. on the same variety of sweet crudes as fed to B unit. It comprises a prefractionator tower and reboiler furnace (called B-1) which were released from original use in the straightrun fractionation section but it does not have a desalter. A second furnace (B-2) is incorporated in the unit. It formerly served the butanes splitter unit in the cat fractionation section. The crude stream to this third topping unit is split about 50-50 between the two furnaces. The convection section and half the radiant bank of B-1 furnace heat crude and the remaining radiant coils remain in original service as the depropanizer reboiler in the straightrun fractionation section. Coil outlet temperatures on these furnaces are maintained at about 660° F. Exchangers and other auxiliary equipment for the C unit were assembled from equipment formerly used elsewhere.

The prefractionator unit, formerly used in the section handling combined topping-unit overhead streams, furnished a naphtha cut for thermal reforming. When it was converted to crude topping, the two original crude units were modified to produce a heavy naphtha cut from part of the top tray reflux on the primary fractionators. Boiling range of this heavy naphtha cut is adjusted to conform to over-all plant gasoline balance.

In addition to the considerable expansion of capacity in the crude-topping section, light-ends recovery has been improved. Formerly, uncondensed gas from the topping-unit overhead condensers was charged directly to the refinery fuel-gas system, while liquid passed to the straightrun fractionation section. The gas stream from the three crude units is now compressed and combined with gas in

the cat fractionation section where additional butanes are recovered.

Straightrun Fractionation

The straightrun fractionation section handles the condensed overhead streams from the crude-topping units. It comprises depropanizer, debutanizer, and isopentane towers and produces some gas for plant fuel, butanes for gasoline blending and alkylation, and isopentane and light naphtha for blending to aviation and motor gasolines. The heavy naphtha cut formerly charged to the section prefractionator is now taken directly from the topping units.

Originally, charge to the depropanizer averaged 12,240 bbl. per stream day. Modifications have allowed charge rates under present operations, as high as 30,000 bbl. and normally 23,000 bbl. The major changes permit this expansion. An old wash drum was installed as a surge chamber in the feed line to the section. This tends to smooth out operations and prevent surging on rapid changes in feed-stock characteristics. Limited by reboiler heat available to the depropanizer, engineers increased the unit's capacity by adding a feed preheat unit.

Propane Deasphalting

The propane-deasphalting unit, designed to remove a small, heavy asphalt fraction from 14,250 bbl. per stream day of topped crude, was handling as much as 23,000 bbl. per day until recent months. This was made possible largely by addition of two more propane condensers and some pump revisions. Also, changes in light-ends-recovery operation elsewhere in the refinery improved the purity of propane available to the process. This increased allowable propane circulation by improving condenser efficiency with less ethane present. A lower unsaturate content in propane also promoted better phase separation in the settlers.

Propane-oil ratios average between 3½ to 1 and 5 to 1, and have gone as high as 6 to 1 under certain conditions. The maximum obtainable propane-oil ratio is maintained to give best possible separation efficiency of the propane-asphalt and oil-propane phases in the settlers. Settler temperature is then varied to obtain the desired yield and quality of deasphalted gas oil for catalytic cracking.

Installation of the Cit-Con plant (a joint operation of Cities Service and Continental Oil Co.) has recently relieved the heavy load on the deasphalting unit. Now, the reduced-crude fraction from topping unit A moves directly to Cit-Con and the deasphalting unit takes residual fractions from the other two crude units. Without the Cit-Con operation, major additions to the propane deasphalting facilities would have been required if the high throughput rates were to be maintained. Thus while Cit-Con is not a part of the basic refinery, its addition to the operation amounts to a sizable increase in capacity by relieving the plant of further processing a large fraction of reduced crude.

The extract fractions from Cit-Con's Duo-Sol unit are returned to the basic refinery. This stream comprises either extract from the heavy intermediate or bright stock from the solvent extraction unit. These extracts may be either blended to No. 6 fuel oil or deasphalted to provide additional cat cracking charge, depending on the desired balance of heavy and light fuels.

An excess of propane is available in the refinery. This assures sufficient supply to the deasphalting unit for most efficient operation. It also relieves the necessity for complete propane recovery in the unit, and excess propane is vented to plant fuel from that unit.

Thermal Reforming

The 10,000-bbl. per stream day naphtha reformer has become a versatile unit, performing several important functions in addition to its principal one. It has been modified to meet its new uses and has operated satisfactorily on heavy naphtha reforming runs up to 12,000 bbl. per stream day. The unit is switched regularly on blocked operation, to the thermal cracking of heavy cycle oil from the cat units.

Thermal cracking takes place at optimum daily rates averaging 13,350 bbl. and maximum rates up to 16,000 bbl. This operation produces gasoline, light ends, and cutback oil for blending with the straightrun asphalt from the deasphalting unit, for No. 6 fuel oil. Naphtha reforming yields butanes for the butadiene plant, propylene for alkylation, and an upgraded gasoline for motor-fuel blending. The balance maintained between these two principal operations and the quantity and quality of reform feed, are governed by requirements for over-all gasoline yields. Operators are able to switch from cracking to reforming and back without bringing the unit down. Here again, increased distillate yield afforded a plant capacity expansion without major thermal cracking additions. Without the swing to distillates, present thermal cracking capacity would be entirely inadequate and substantial additions would be necessary to maintain comparable crude-processing rates.

The unit also serves as a standby crude-topping unit during turnarounds and has operated as a rerun unit on plant slop. These expanded operations required some modifications. Engineers have removed some of the internals located below the heavy gas-oil drawoff pan in the fractionator bottom. Elimination of these members has reduced coke-cleaning time during turnaround and in effect increased per calendar day capacity of the unit.

Better control of cracking was provided by introduction of quenching at the feed inlet to the tower. A recycle gas-oil stream reduces oil outlet temperature of the naphtha charge at this point from 1,025° to 700° F., substantially reducing potential coking in the tower bottom. Coke deposition was also suppressed by revamping the feed section of the tower to reduce turbulence and splashing against vessel internals. This was accomplished by installing a baffle and submerging the inlet feed nozzle.

Fluid Catalytic Cracking

The heart of the refinery is the cat cracking section, consisting of three nearly identical fluid units and a common catalytic fractionation section which recovers and separates the overhead streams from the three primary cat fractionators. In initial wartime operation, the A and B units cracked light and heavy gas oils separately under conditions determined to produce maximum yields of normal butylenes and a C_4-475° F. fraction. The former was converted to butadiene and the latter "retreated" in the C unit, producing high yields of high-quality aviation-base stock.

The three units now process mixtures of six segregated types of feed stock; virgin light and heavy gas oils from the crude units, deasphalted gas oil from the propane deasphalting unit, and light and heavy cycle oils and slurry oil from the cat units themselves.

Originally designed for about 17,000 bbl. of total feed per stream day, including slurry, each unit is capable of much greater throughput when operated for higher distillate production. Severity of the cracking operation is now much less than during wartime. Thus the units operate at much lower reactor-bed levels and lower temperatures, which combine to reduce coke deposition on catalyst and expand effective capacity of the regenerators. Improved stripping methods in the reactors have had the same effect in increasing regenerator capacity by coke reduction.

The common combustion-air and precipitator-air supply to all units has been increased. Additional pumps and fractionator modifications plus operational changes made on individual units have further augmented over-all capacity of the cat cracking section.

Under normal operation, each of the cat units processes a fixed type of feed for which individual operating conditions are set for maximum efficiency. This unique plan takes full advantage of the unusually large cat cracking capacity in the refinery.

The A unit now charges all of the deasphalted gas oil (called DAGO) produced by the propane deasphalting

(Continued on page 86)

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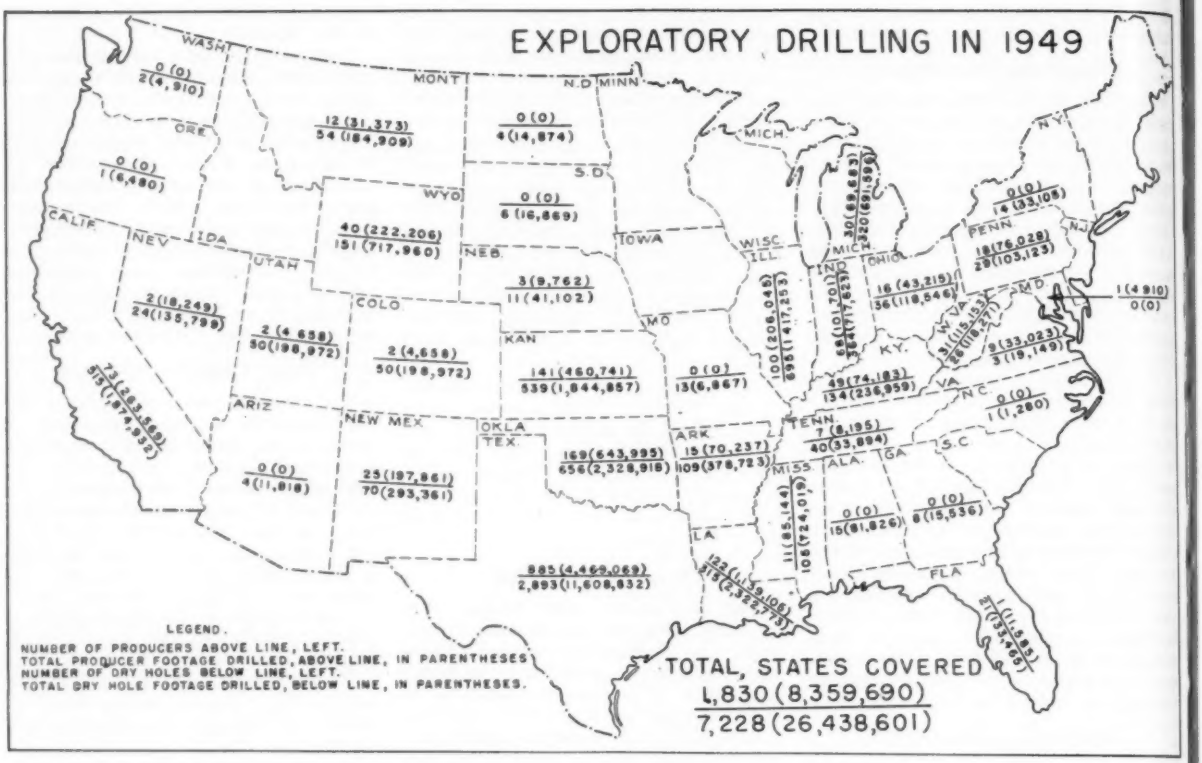
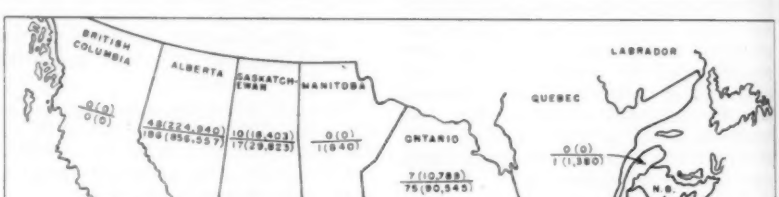


Fig. 1—(Above) Here's how the oil states fared in exploratory drilling, as to number of producers and dry holes with footage drilled for each.

Fig. 1-A—(Right) And here's the score for Canada, and how its provinces fared in 1949.



Wildcat Drilling in 1949

by Frederick H. Lahee*

This extensive digest of the report of the chairman of the A.A.P.G. Committee on Exploratory Statistics, presented at the Chicago meeting, is published by special permission of the author and the A.A.P.G. The full report will be printed later in the A.A.P.G. Bulletin. The author is geological and research counselor for Sun Oil Co.

IN the states covered in this review, during 1949, a total of 34,798,291 ft. was drilled in 9,058 exploratory holes, divided as follows:

	Feet
1,830 producers	8,359,690
7,228 dry holes	26,438,601

This means that 20.2 per cent of the holes drilled, and 24.0 per cent of the footage drilled, were successful in 1949. One producer foot was drilled for every 3.16 ft. of dry hole. One successful well was drilled for every 3.95 dry holes. The average depth of hole was 3,842 ft.

In Table 3 is shown a percentage analysis of the exploratory drilling in 1949 and also in 1947 and 1948. In 1949, the percentage of new-field wildcatting, in the entire exploratory drilling program, was very near 49 per cent. That for new-pool testing was just over 27 per cent, and that for outpost drilling was just under 24 per cent. In Table 4 are listed comparative data from 1938 to 1949, inclusive.

Table 5 shows the relative success, as measured by the number of producers in comparison with the number of dry holes, in each year from 1944 to 1949, inclusive.

As indicated in Table 1, a hole may be located as an outpost with the intention of trying to extend a pool partly developed, but instead it may discover a new pool. Similarly, a new-pool wildcat may be located in search of a new pool because it is believed to be well outside the limits of the known pool, but instead it may result in extending this known pool farther than had been expected. A majority of outposts, if successful, are completed as extension wells and a majority of new-pool wildcats, if successful, discover new pools.

To show the class distribution of these completions in 1949, we prepared Table 6. Here we see that 425 outposts were completed as ex-

tension wells and 88 were completed as new-pool discoveries; and 314 new-pool wildcats discovered new pools whereas 61 new-pool wildcats were completed as extension wells.

A question sometimes asked concerns the approximate percentage of true wildcatting (new-field wildcatting) by major companies, on the one hand, and by minor companies and independents, on the other hand. Distinction between these three classes of operators is not always easy, and in some instances the same company may be regarded as a "major" in one district, but as a "minor" in another district. Consequently we left the classification to the judgment of the various committeemen, each for his own district. Usually a major company is defined as one which is integrated with respect to at least three of the four main branches of production, transportation, refining, and marketing.

Our statistics showed that in the country as a whole in 1949, 845 new-field wildcats (172 producers and 673 dry holes) were drilled by majors; 3,329 new-field wildcats (306 producers and 3,023 dry holes) were drilled by minors and independents; and 275 new-field wildcats (28 producers and 247 dry holes) were drilled by minors or independents with the drilling financed by major companies.

In recent years we have included in our annual report a table showing the number of fields discovered each year, from 1938 to the year preceding the year reported, these fields being grouped according to a rough estimate of their total ultimate reserves from the date of discovery. The fields were grouped according to these estimates: "A" meaning a total ultimate of 50 million barrels or more; "B," from 25 to 50 million barrels; "C," from 10 to 25 million barrels; "D," from 1 to 10 million barrels; "E," less than 1 million barrels; and "F," abandoned. Gas fields were not included unless they also produced condensate. A few fields were omitted where satisfactory estimates were not readily obtainable.

Fig. 2—Detailed data on exploratory drilling for southeastern New Mexico, Texas, Louisiana.

Each year, since we have presented this table, all the fields have been reestimated. This we have found to be a very onerous task, and not too closely related to the functions of our committee. Yet we have felt that something of the kind is desirable. Therefore, in the present report, we are changing our approach.

We are recording, in Table 7, estimated total ultimate reserves only for the discoveries of 1943, 1946, and 1949. This is the first year in which we have attempted such an estimate of the fields discovered in the year just closed. Previously we have allowed a year to elapse. The estimates in Table 7 were all made in January 1950, those referring to discoveries of 1943 and 1946 being revisions, where revisions seemed necessary.

In making these revisions, among the discoveries of 1946, 2 B's were raised to A; 2 D's were raised to C; 13 E's were raised to D; 5 D's were lowered to E; and 7 E's were lowered to F. Among the discoveries of 1943, 3 B's were raised to A; 7 D's were raised to C; 17 E's were raised to D; 3 D's were lowered to E; and 15 E's were lowered to F. These changes were made in the estimates prepared for these discoveries of 1946 and 1943 in January 1949.

It will be interesting to see how many changes there will be, and in what direction, in reestimating the 1946 discoveries and the 1949 discoveries 3 years hence; for it is our plan to make these estimates of the fields discovered in any given year only 3 years and 6 years, respectively, after their dates of discovery, with a rough preliminary estimate given just after their discovery.

In conclusion with reference to exploratory drilling in the United States, comparing 1949 figures with those of 1948, we note the following:

1. In number of exploratory holes drilled there was an increase of 13.0 per cent, and in exploratory footage drilled there was an increase of 6.3 per cent. The increases in 1949 over 1947, based on 1947 figures, were 33.7 per cent in holes drilled and 31.8 per cent in footage.

2. Considering only the new-field wildcats, 1949 witnessed an increase of 3.56 per cent in holes drilled and a decrease of 3.1 per cent in footage drilled, compared with 1948. Compared with 1947, the corresponding figures in 1949, both increases, were 27.8 and 24.2 per cent respectively.

3. In California, Illinois, Indiana, Texas, and Wyoming there were large increases in exploratory drill-

TABLE 1—CLASSIFICATION OF EXPLORATORY WELLS

				I. *Classification When Drilling Is Started*	II. *Classification After Completion or Abandonment*	
				A	*B*	*C*
Drilling for long extension of partly developed pool				1 Outpost (Extension test)	1 Extension well (Sometimes a new-pool discovery well)	1 Dry outpost (Dry extension test)
Drilling for a *new pool* on a structure or in a geological environment already productive	New-pool tests	Drilling within limits of proved area of pool	For new pool above deepest pool	2a Shallower-pool test	New-pool discovery wells (Or sometimes extension wells): 2a Shallower-pool discovery well (Sometimes shallower-pool extension well)	Dry new-pool tests: 2a Dry shallower-pool test
			For new pool below deepest pool	2b Deeper-pool test	2b Deeper-pool discovery well (Sometimes deeper-pool extension)	2b Dry deeper-pool test
		Drilling outside limits of proved area of pool		2c New-pool wildcat	2c New pool discovery wildcat (Sometimes an extension well)	2c Dry new-pool wildcat
Drilling for a *new field* (on a structure or in an environment never before productive)				3 New-field wildcat	3 New-field discovery wildcat	3 Dry new-field wildcat

TABLE 2—NUMBER OF OIL WELLS, GAS WELLS, CONDENSATE WELLS, AND DRY HOLES DRILLED IN UNITED STATES AS EXPORATORY TESTS IN 1949

States—	Oil producers		Gas producers		Condensate producers		Total producers		Dry holes		Grand totals		Average depth of hole*
	No. of holes	Footage	No. of holes	Footage	No. of holes	Footage	No. of holes	Footage	No. of holes	Footage	No. of holes	Footage	
Alabama	0	0	0	0	0	0	0	0	15	81,826	15	81,826	....
Arizona	0	0	0	0	0	0	0	0	4	11,818	4	11,818	....
Arkansas	11	50,801	3	12,033	1	7,403	15	70,237	109	378,723	124	448,960	3,621
California	60	206,863	13	56,706	0	0	73	263,569	515	1,874,932	588	2,138,501	3,637
Colorado	1	435	1	4,223	0	0	2	4,658	50	198,972	52	203,630	3,916
Florida	1	11,585	0	0	0	0	1	11,585	21	133,465	22	145,050	....
Georgia	0	0	0	0	0	0	0	0	8	15,536	8	15,536	....
Illinois	96	203,143	4	2,902	0	0	100	206,045	695	1,417,253	795	1,623,298	2,042
Indiana	61	93,885	7	7,816	0	0	68	101,701	364	717,623	432	819,324	1,897
Kansas	127	420,339	14	40,402	0	0	141	460,741	539	1,844,857	680	2,305,598	3,391
Kentucky	36	56,774	13	17,409	0	0	49	74,183	134	236,959	183	311,142	1,700
Louisiana	71	614,909	10	89,603	41	434,593	122	1,139,105	315	2,322,773	437	3,461,878	7,922
Maryland	0	0	1	4,910	0	0	1	4,910	0	0	1	4,910	....
Michigan	26	59,286	4	10,397	0	0	30	69,683	320	691,596	350	761,279	2,175
Mississippi	8	59,711	0	0	3	25,433	11	85,144	105	724,019	116	809,163	6,975
Missouri	0	0	0	0	0	0	0	0	13	6,867	13	6,867	....
Montana	8	21,977	4	9,396	0	0	12	31,373	54	184,909	66	216,282	3,277
Nebraska	2	4,567	1	5,195	0	0	3	9,762	11	41,102	14	50,864	....
New Mexico	23	182,614	2	15,247	0	0	25	197,861	70	293,361	95	491,222	5,171
New York	0	0	0	0	0	0	0	0	14	33,105	14	33,105	....
North Carolina	0	0	0	0	0	0	0	0	1	1,280	1	1,280	....
North Dakota	0	0	0	0	0	0	0	0	4	14,874	4	14,874	....
Ohio	6	14,162	10	29,053	0	0	16	43,215	36	118,546	52	161,761	3,111
Oklahoma	143	558,469	24	74,604	2	10,922	169	643,995	656	2,328,918	825	2,972,913	3,604
Oregon	0	0	0	0	0	0	0	0	1	6,480	1	6,480	....
Pennsylvania	0	0	18	76,028	0	0	18	76,028	29	103,123	47	179,151	3,812
South Dakota	0	0	0	0	0	0	0	0	6	16,869	6	16,869	....
Tennessee	6	6,542	1	1,653	0	0	7	8,195	40	33,894	47	42,089	896
Texas	676	3,145,165	117	583,037	92	740,867	885	4,469,069	2,893	11,608,832	3,778	16,077,901	4,256
Utah	2	18,249	0	0	0	0	2	18,249	24	135,799	26	154,048	5,925
Virginia	2	4,818	7	28,205	0	0	9	33,023	3	19,149	12	52,172	....
Washington	0	0	0	0	0	0	0	0	2	4,910	2	4,910	....
West Virginia	1	1,167	30	113,986	0	0	31	115,153	26	118,271	57	233,424	4,095
Wyoming	39	214,999	1	7,207	0	0	40	222,206	151	717,960	191	940,166	4,922
Total	1,406	5,950,460	285	1,190,012	139	1,219,218	1,830	8,359,690	7,228	26,438,601	9,058	34,798,291	3,842

*Average per-well footage given only where 25 or more wells drilled in a state.

TABLE 3—PERCENTAGE OF EXPLORATORY HOLES DRILLED IN EACH CLASS IN UNITED STATES IN 1947, 1948, AND 1949

	1947 Number	1947 well per cent	1947 Class per cent	1948 Number	1948 well per cent	1948 Class per cent	1949 Number	1949 well per cent	1949 Class per cent
Outposts:									
Producers	489	31.71		490	27.74		668	31.04	
Dry holes	1,055	68.29		1,276	72.26		1,484	68.96	
Total	1,542	100.00	22.76	1,766	100.00	22.04	2,152	100.00	23.76
New-pool wildcats:									
Producers	324	26.64		325	22.12		469	25.11	
Dry holes	892	73.36		1,144	77.88		1,399	74.89	
Total	1,216	100.00	17.95	1,469	100.00	18.33	1,868	100.00	20.62
Deeper-pool tests:									
Producers	145	29.06		117	27.02		130	25.89	
Dry holes	354	70.95		316	72.98		372	74.11	
Total	499	100.00	7.37	433	100.00	5.40	502	100.00	5.54
Shallower-pool tests:									
Producers	26	68.42		30	58.82		57	65.52	
Dry holes	12	31.58		19	41.18		30	34.48	
Total	38	100.00	.56	49	100.00	.61	87	100.00	.96
New-field wildcats:									
Producers	394	11.32		501	11.66		506	11.37	
Dry holes	3,086	88.68		3,795	88.34		3,943	88.63	
Total	3,480	100.00	51.36	4,296	100.00	53.62	4,449	100.00	49.12
Total producers	1,378	20.34		1,463	18.25		1,830	20.20	
Total dry holes	5,397	79.56		6,550	81.75		7,228	79.80	
Grand total	6,775	100.00	100.00	8,013	100.00	100.00	9,058	100.00	100.00

ing in 1949, contrasted with 1948, but there was a decrease in Kentucky, New Mexico, New York, Ohio, Pennsylvania, and Tennessee.

4. The average depth of hole for all exploratory drilling decreased from 4,086 ft. in 1948 to 3,842 ft. in 1949. Again, this year, Louisiana holds the record (7,922 ft.) for average depth of exploratory hole, and Mississippi is again second with 6,975 ft.

TABLE 5—RELATIVE SUCCESS OF EXPLORATORY DRILLING IN UNITED STATES FROM 1944 TO 1949, INCLUSIVE

Year	New-field wildcats: No. of dry holes for each producer	New-field wildcats: Percentage of wells successful	All exploratory holes: No. of dry holes for each producer	All exploratory holes: Percentage of wells successful
1944	8.05	11.05	4.08	19.67
1945	7.63	11.59	3.62	21.64
1946	8.39	10.65	4.06	19.76
1947	7.80	11.32	3.90	20.34
1948	7.57	11.66	4.50	18.25
1949	7.79	11.37	3.95	20.20
Average for the 6 years	7.85	11.29	4.02	19.90

Exploratory Drilling in Canada

In western Canada, in 1949, 262 exploratory holes were completed, 58 of these being producers and 204 being dry holes. The producers included 37 oil wells, 19 gas wells, and 2 condensate wells. A total of 1,130,563 ft. was drilled, 243,343 ft. in producers and 887,220 ft. in dry holes. This means that 21.37 per cent of the exploratory holes and 21.52 per cent of the exploratory footage were successful. There were 3.6 ft. drilled in dry holes for every foot drilled in

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TABLE 4—STATISTICS ON EXPLORATORY HOLES AND FOOTAGE DRILLED, AND ON AVERAGE DEPTH OF EXPLORATORY HOLE IN UNITED STATES

Year	A Successful exploratory wells: Total producers*	B Successful exploratory wells: New-field discovery wells	C B is what per cent of A	D No. of dry exploratory holes	E Total exploratory holes (A + D)	F No. of dry exploratory holes drilled for each producer (D/A)	G Total footage in successful exploratory holes	H Total footage in dry exploratory holes	I No. of feet drilled in dry holes for each foot in producers (H/G)	J Total exploratory footage (G + H)	K Average depth of exploratory hole (J/E)
1938	294 oil 369 75 gas	226	61.2	2,269	2,638	6.14	1,526,557	7,333,927	4.8	8,860,484	3,359
1939†	226 oil 275 49 gas	175	63.6	2,427	2,702	8.81	1,118,420	7,674,677	6.88	8,793,097	3,331
1940	302 oil 366 64 gas	241	65.8	2,672	3,038	7.30	1,411,550	8,842,418	6.26	10,253,948	3,375
1941	416 oil 503 60 gas 27 cond.	282	56.1	2,761	3,264	5.48	2,047,377	9,567,708	4.66	11,615,085	3,559
1942	410 oil 492 53 gas 29 cond.	268	54.5	2,720	3,212	5.52	2,158,707	9,965,287	4.62	12,123,994	3,775
1943‡	530 oil 714 147 gas 37 cond.	400	56.0	3,294	4,008	4.61	2,936,266	12,783,447	4.35	15,719,713	3,922
1944	709 oil 944 149 gas 86 cond.	342	36.2	3,852	4,796	4.08	4,382,220	15,843,667	3.61	20,225,887	4,217
1945	840 oil 1,214 274 gas 100 cond.	352	29.0	4,399	5,613	3.62	5,501,702	17,528,564	3.19	23,030,266	4,103
1946§	762 oil 1,137 272 gas 103 cond.	333	29.3	4,622	5,759	4.06	5,286,711	16,911,032	3.18	22,197,743	3,854
1947	981 oil 1,378 325 gas 72 cond.	394	28.6	5,397	6,775	3.90	6,166,163	20,227,185	3.28	26,393,348	3,896
1948	1,098 oil 1,463 255 gas 110 cond.	501	34.2	6,550	8,013	4.48	7,179,450	25,561,647	3.56	32,741,097	4,086
1949	1,406 oil 1,830 285 gas 139 cond.	506	27.6	7,228	9,058	3.95	8,359,690	26,438,601	3.16	34,798,291	3,843

*In the years 1938 to 1940, inclusive, condensate-plus-gas wells are included with gas wells. After 1940 gas wells and condensate-plus-gas wells are listed separately in this table. †Kentucky statistics were added for 1939 after publication of that year's report. ‡Statistics for New York, Pennsylvania, and eastern Ohio have been included here in 1943, although they came in too late for publication in the 1943 report. §Six dry new-field wildcats, with a total of 30,182 ft., drilled in North Caroline and omitted by mistake in the 1946 report, have been added here in Table 4.

TABLE 6—NEW-POOL DISCOVERIES* AND EXTENSIONS OF OLDER POOLS IN UNITED STATES IN 1949

	New pools* discovered in 1949: By outposts	By new-pool wildcats	By deeper-pool tests	By shallower-pool tests	Total new pools discovered in 1949	Extensions of old pools: By outposts	By new-pool wildcats	By deeper-pool tests	By shallower-pool tests	Total extensions in 1949
Oil	88	314	100	44	546	425	61	9	1	496
Gas	19	63	11	10	103	85	9	2	0	96
Condensate	11	18	8	2	39	41	3	0	0	44
Total	118	395	119	56	688	551	73	11	1	636

*This table does not include discoveries of new fields.

TABLE 7—FIELDS* DISCOVERED IN 1943, 1946, AND 1949, GROUPED ACCORDING TO THEIR ULTIMATE RESERVES AS ESTIMATED JANUARY 1, 1950

(Number of fields discovered in year indicated)

Year of discovery	Reserves groups†: A	B	C	D	E	F	Total A—F inclusive	A + B + C fields	Percentage of A + B + C fields in total fields
1943	5	2	20	75	153	38	293	27	9.2
1946	3	1	5	64	162	22	257	9	3.5
1949	6	2	5	62	341	1	417	13	3.1

*This table refers only to the states of Alabama, Arkansas, California, Colorado, Illinois, Indiana, Kansas, Kentucky, Louisiana, Michigan, Mississippi, Montana, Nebraska, New Mexico, Oklahoma, Texas, and Wyoming. It does not include gas fields unless natural gas liquids are produced, and then the reserves figure relates only to these liquids. A few were omitted because of inadequate estimates, and a few producing areas, at first thought to be new fields, have become consolidated with other fields. †In this table, A means 50 million barrels or more, B means between 25 and 50 million barrels, C means between 10 and 25 million barrels, D means between 1 and 10 million barrels, E means less than 1 million barrels, F means abandoned.

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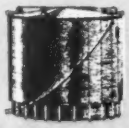
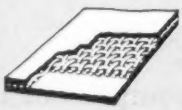
The Wiggins Gasholder  is not affected by cold , by heat , by ice , snow, rain or even earthquakes. The entire space

is used for storage. Gas is delivered dry, pure, undiluted because of the absolutely dry, frictionless seal  which is inert to gas action—and cannot evaporate, freeze or blow out. This seal principle has proved itself in 15 years' service in the field. Safe storage at pressures up to 20" of water .

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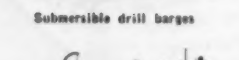

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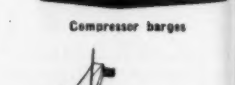

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TABLE 8—EXPLORATORY DRILLING IN CANADA IN 1949

Province and well classification—	Oil		Gas		Condensate		Ttl. producing		Dry		Grand total	
	No.	Footage	No.	Footage	No.	Footage	No.	Footage	No.	Footage	No.	Footage
Alberta:												
Outposts	12	40,770	0	0	0	0	12	40,770	10	43,748	22	84,518
New-pool wildcats	2	10,515	0	0	0	0	2	10,515	9	40,534	11	51,049
Deeper-pool tests	0	0	0	0	0	0	0	0	1	4,692	1	4,692
New-field wildcats	13	68,026	19	87,138	2	18,491	34	173,655	166	767,583	200	941,238
Total	27	119,311	19	87,138	2	18,491	48	224,940	186	856,557	234	1,081,497
Gaspe:												
New-field wildcats	0	0	0	0	0	0	0	0	1	1,380	1	1,380
Total	0	0	0	0	0	0	0	0	1	1,380	1	1,380
Manitoba:												
New-field wildcats	0	0	0	0	0	0	0	0	1	840	1	840
Total	0	0	0	0	0	0	0	0	1	840	1	840
New Brunswick:												
New-pool wildcats	0	0	0	0	0	0	0	0	1	3,480	1	3,480
New-field wildcats	0	0	0	0	0	0	0	0	1	3,414	1	3,414
Total	0	0	0	0	0	0	0	0	2	6,894	2	6,894
Ontario:												
Outposts	0	0	2	2,955	0	0	2	2,955	2	3,157	4	6,112
New-pool wildcats	0	0	5	7,834	0	0	5	7,834	1	2,537	6	10,371
Deeper-pool tests	0	0	0	0	0	0	0	0	2	3,534	2	3,534
New-field wildcats	0	0	0	0	0	0	0	0	70	81,317	70	81,317
Total	0	0	7	10,789	0	0	7	10,789	75	90,545	82	101,334
Saskatchewan:												
Outposts	6	10,872	0	0	0	0	6	10,872	5	9,120	11	19,992
New-pool wildcats	2	3,972	0	0	0	0	2	3,972	0	0	2	3,972
New-field wildcats	2	3,559	0	0	0	0	2	3,559	12	20,703	14	24,262
Total	10	18,403	0	0	0	0	10	18,403	17	29,823	27	48,226
Total:												
Outposts	18	51,642	2	2,955	0	0	20	54,597	17	56,025	37	110,622
New-pool wildcats	4	14,487	5	7,834	0	0	9	22,321	11	46,551	20	68,872
Deeper-pool tests	0	0	0	0	0	0	0	0	3	8,226	3	8,226
New-field wildcats	15	71,585	19	87,138	2	18,491	36	177,214	251	875,237	287	1,052,451
Grand total	37	137,714	26	97,927	2	18,491	65	254,132	282	986,039	347	1,240,171

TABLE 9—EXPLORATORY DRILLING IN MEXICO IN 1949

State and well classification—	Producers						Dry		Grand total	
	Oil		Condensate		Total					
	No.	Footage	No.	Footage	No.	Footage	No.	Footage	No.	Footage
Chihuahua:										
New-field wildcats	0	0	0	0	0	0	1	10,499	1	10,499
Puebla:										
New-field wildcats	0	0	0	0	0	0	1	4,322	1	4,322
San Luis Potosi:										
New-pool wildcats	1	2,487	0	0	1	2,487	0	0	1	2,487
Tabasco:										
New-field wildcats	0	0	1	6,972	1	6,972	2	19,256	3	26,228
Tamaulipas:										
Outposts	0	0	2	13,453	2	13,453	0	0	2	13,453
New-pool wildcats	0	0	3	24,461	3	24,461	0	0	3	24,461
Deeper-pool tests	0	0	0	0	0	0	2	4,742	2	4,742
New-field wildcats	1	5,889	1	7,359	2	13,248	6	45,809	8	59,057
Vera Cruz:										
Outposts	2	9,831	0	0	2	9,831	6	31,041	8	40,872
New-pool wildcats	2	4,703	0	0	2	4,703	9	20,476	11	25,179
Shallower-pool tests	1	1,849	0	0	1	1,849	0	0	1	1,849
New-field wildcats	0	0	0	0	0	0	10	59,814	10	59,814
Summary:										
Total outposts	2	9,831	2	13,453	4	23,284	6	31,041	10	54,325
Total new-pool wildcats	3	7,190	3	24,461	6	31,651	9	20,476	15	52,127
Total deeper-pool tests	0	0	0	0	0	0	2	4,742	2	4,742
Total shallower-pool tests	1	1,849	0	0	1	1,849	0	0	1	1,849
Total new-field wildcats	1	5,889	2	14,331	3	20,220	20	139,700	23	159,920
Total exploratory holes	7	24,759	7	52,245	14	77,004	37	195,959	51	272,963

producers. For every producer completed, 3.5 dry holes were abandoned. The average depth of all the exploratory holes was 4,315 ft.

Among the 215 new-field wildcats completed in 1949, 36 were successful and 179 were dry. In other words, new-field wildcatting was 16.7 per cent successful. One producer was drilled for every five dry holes. Independents drilled 121 of the new-field wildcats (20 producers and 101 dry holes).

In eastern Canada, 85 exploratory holes were drilled, with a total of 109,608 ft. Seven of the 85 holes were successful, all as gas wells, and all in southwestern Ontario. In these producers, 10,789 ft. were drilled. Of the 85 holes, 8.2 per cent were successful; 9.8 per cent of the exploratory footage was in successful holes. For every foot drilled in producers, 10.16 ft. were drilled in dry holes. The average depth of hole was 1,289.5 ft.

All but 12 of these exploratory holes in eastern Canada were new-field wildcats. There were no successful new-field wildcats. Among the 73 new-field wildcats 44 were drilled by major companies and 29 by minors or independents.

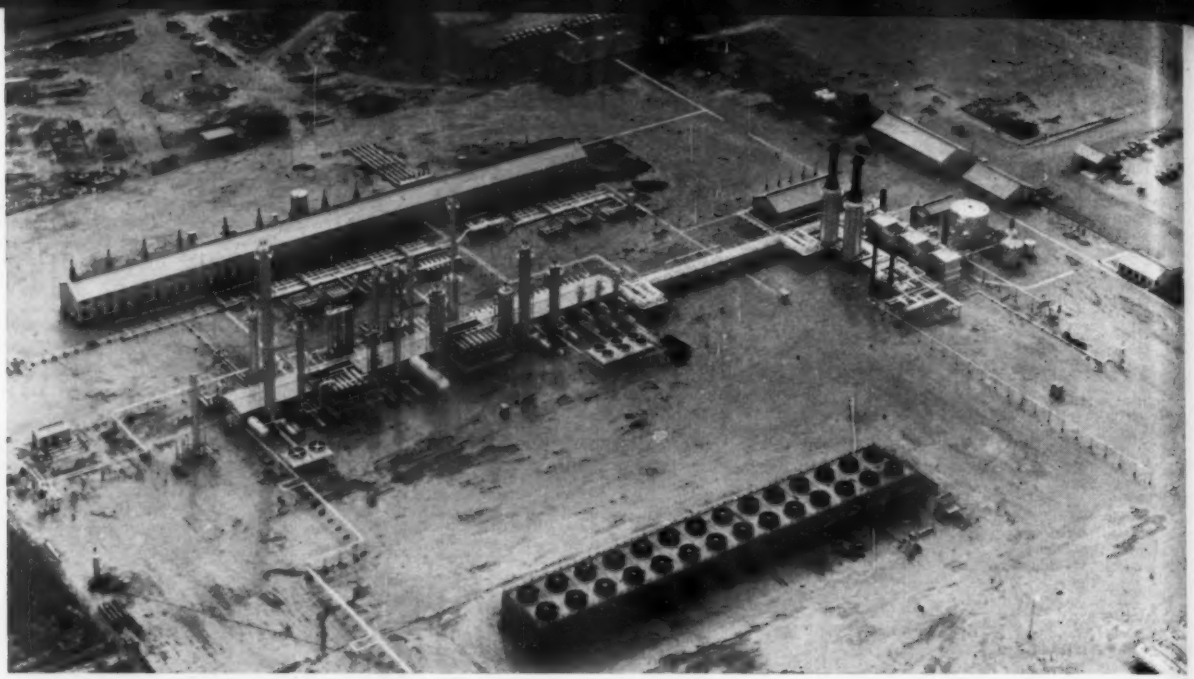
Exploratory Drilling in Mexico

All exploratory drilling in Mexico was accomplished through the governmental organization, Petroleos Mexicanos. A total of 51 exploratory holes were drilled, with a total of 272,963 ft. Of these holes, 14 (7 oil wells and 7 condensate producers) were successful, these 14 holes having a total of 77,004 ft. According to these figures, this exploratory program was 27.5 per cent successful. For each producer foot, 2.5 ft. were drilled in dry holes. The average depth of all 51 holes was 5,352 ft. Twenty-three of the 51 holes were new-field wildcats, and 3 of these, or 13 per cent were successful.

General Conclusion

Probably the most striking thing brought out by our analysis of the

(Continued on page 88)



HUGE MULTIPURPOSE PLANT.—Aerial view shows large induced-draft cooling tower in foreground, and the 572-ft.-long compressor building in background. Rich-oil heaters, Dowtherm vaporizers, and steam boilers are shown in the operational group unit to the right. (Photo by Elwood M. Payne, New York-Houston.)

Seeligson Field

Pressure-Maintenance and Hydrocarbon-Recovery Plant

by D. T. McDonald

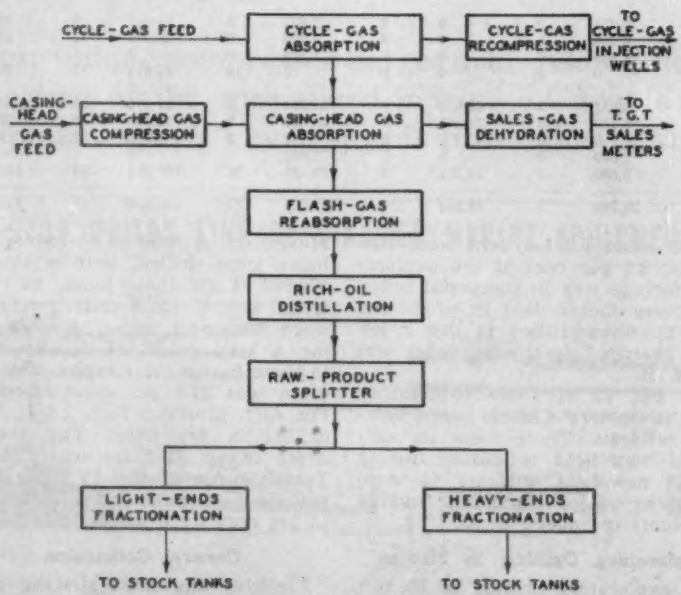


DIAGRAM.—Seeligson plant process flow (by Magnolia Petroleum Co., natural gas department).

OPERATORS in Seeligson field, Jim Wells County, Texas, have installed a plant that, at full design load, is rated to handle 150,000,000 standard cubic feet per day of cycle gas and 70,000,000 standard cubic feet per day of oil-well gas at an assured propane-extraction efficiency of 75 per cent. The plant is designed to gather oil-well gas from an atmospheric pressure separation in the field, and to compress, process, dehydrate, and deliver the residue gas to transmission pipe lines at 1,000 psig. plant discharge pressure. Wet gas from the condensate-type reservoirs is produced through high-pressure primary cycle absorbers and the residue returned to the reservoirs for pressure-maintenance and cycling operations.

In addition to these primary functions, the plant furnishes gas-lift service to various oil-well leases from the discharge of the 1,000-psig. casing-head-gas portion of the plant. The oil-well-gas compressor station lacks two reciprocating units that would bring its capacity up to the 70,000,000 standard cubic feet per day process design load.

The Seeligson plant is capable of making propane, isobutane, normal butane, gasoline (ranging from 9 lb. R.v.p. motor-fuel base to 26-70 grade natural gasoline), naphtha, kerosine, absorption oil, and residuum as stock-tank products. As a byproduct from the manufacture of propane, the de-ethanizer overhead product is approximately 2,000,000 standard cubic feet per day of 95 per cent purity ethane.

The physical installation of the plant has been made on a 65-acre plant site bounded by the T. & N. O. Railroad on the west side, and a paved

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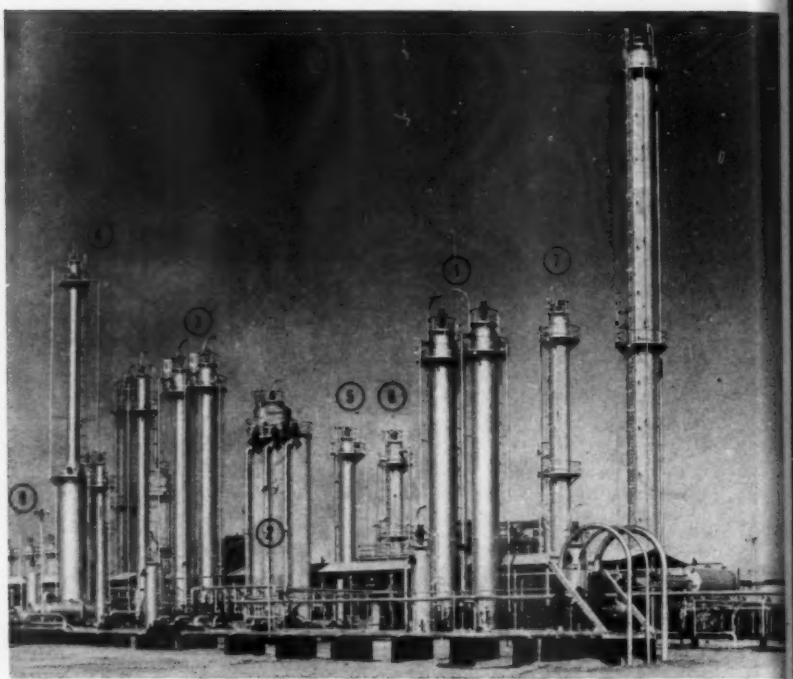
The Author

Dan T. McDonald is chief process engineer in the natural-gas department of Magnolia Petroleum Co., Dallas. He has risen to that position since 1937 when he joined Magnolia as a utility man at its Kermit gasoline plant. He became a junior engineer with Magnolia at Dallas in August 1939, and engineer in 1942. He was appointed to the position he now holds on January 1, 1945. McDonald's college training was taken at Texas Technological College and at Massachusetts Institute of Technology. He is a member of Tau Beta Pi and Alpha Chi, and a junior member of American Institute of Chemical Engineers.

county road on the south side. U. S. Highway No. 281 parallels the railroad track, thus giving the plant ready access to rail and highway movement of its products. Pipe-line connections are available in the field so that products may be moved through either crude-oil pipe lines or products pipe lines.

Magnolia Petroleum Co. operates the plant for the Seeligson operators and all personnel assigned to the plant are Magnolia employes. Magnolia operates Seeligson field as a separate district with regard to gas operations. Among auxiliary facilities at the plant are a complete gas district office, warehouse, small machine shop, and a 40-acre camp site containing recreation center and 20 houses.

Due to the plant being a combination of casing-head and cycle operations, the plant was designed for a high degree of flexibility of operation. Many unique applications of gas handling and processing equipment have been included to make the plant highly efficient while retaining maximum flexibility of operation.



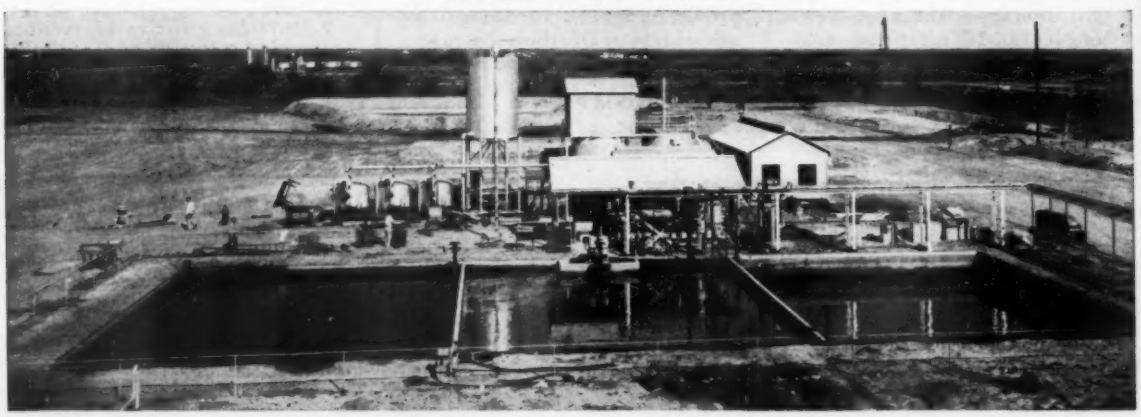
PROCESS AREA.—The individual units are: (1) cycle gas absorber (1,800 psi.); (2) casing-head-gas dehydrator (1,000 psi.); (3) casing-head-gas absorber; (4) propanizer-reabsorber; (5) propanizer-deethanizer; (6) deethanizer; (7) depropanizer; (8) butane splitter; (9) naphtha, kerosine, mineral seal-oil fractionator.

Major Processing Steps

Processing of the gases fed to the Seeligson plant involves a number of closely related steps. The process scheme appears complicated at first glance, but can be broken down into steps that reveal the process is basically simple and straightforward. The general process scheme is shown in the diagram.

1. Cycle-gas absorption.—Wet gas from the condensate wells enters the plant through the scrubber which separates the condensate from the gas phase. Gas from the inlet scrubber is passed through the cycle gas absorbers (1,500 to 1,800 psig.) where it is contacted with absorption oil. The

WASTE-WATER TREATER.—This unusual water treater-disposal unit, adjacent to the Seeligson plant, can treat up to 5,000 bbl. of plant waste water per day, then dispose of it via two injection wells. The troublesome waters (high salt content, sodium chloride, and sodium sulfate) come from the cooling-tower blowdown, the boilers blowdown, from hydrogen ion exchangers (regeneration waste), and the gas coolers. The waste water is processed in these steps: First, coagulation, using ferrous sulfate and activated silica. This is followed by chlorination for sterilization, to prevent growth of sulfate-splitting organisms and also to prevent formation of gelatinous substances on sand face in injection wells. The water then is pumped to three pressure-type rapid sand filters. It gets a CO_2 dosage for pH control before passing to the injection wells.



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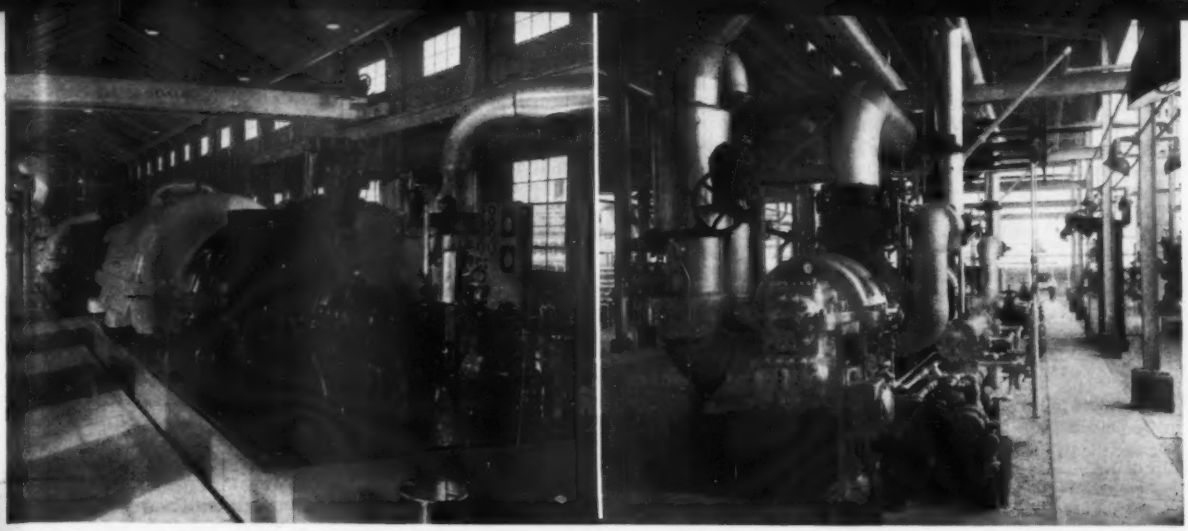

CENTRIFUGAL COMPRESSORS.—(Left) The installations shown here are the first application to gasoline-plant operations. These compressors are steam-turbine driven, and compress 35,000,000 Standard cubic feet per day of casing-head gas from 10-in. Hg vacuum to 36.6 psia. The turbines operate on 600-psi. 825° F. steam at 3,870 r.p.m. and are full condensing. REFRIGERATION COMPRESSORS.—(Right) The centrifugal units shown here are driven by 600-hp. steam turbines and use normal butane as a refrigerant. The turbines operate on 600 psi. 825° F. steam at 7,000 r.p.m. and are full condensing.

residue gas, stripped of the desired components, is discharged through the cycle-gas compressors and returned to the injection wells. The rich oil from the cycle-gas absorbers is flashed into the base of the primary casing-head absorbers which operate at a pressure of about 1,000 psig. The cycle-gas condensate from the inlet scrubber is flashed stepwise through a separate condensate flash system. The flash vapors from the condensate are reabsorbed through various low-pressure absorbers.

2. Casing - head - gas absorption.—Casing-head gas plus recompressed lower-pressure residue gases are fed from the discharge of the casing-head compressors directly to the primary casing-head absorbers (1,000 psig.). The flash gases from the cycle-gas rich-oil flash and first condensate flash, join with the gas from the compressors. The total mixture is contacted with absorption oil in the casing-head-gas absorbers. The stripped residue gas is dehydrated and discharged to either pipe-line sales, gas-lift service, or some can be recompressed for cycle injection.

3. Reabsorption.—The total rich-oil stream is flashed into the base of the 350-psi. reabsorber. The rich-oil flash gas and the second condensate flash are absorbed in the reabsorber.

4. Propanizer reabsorber.—The propanizer reabsorber is a combination tower which operates like a cold fractionator. The total rich oil from the 350-psi. reabsorber is flashed directly into middle section of the propanizer-reabsorber tower. Vapors from the third condensate flash and from the compressor-station third-stage condensate are also fed to the reabsorber section along with the rich oil. Lean oil is pumped over the top section of the tower, which acts as a reabsorber, and the commingled rich oil passes down over the lower propanizing section of the tower. Uncondensed still vapors from raw-product recovery are fed back to the base of the tower to serve as a stripping medium.

The net results of the propanizer-reabsorber action are selectively to stabilize the rich-oil stream and to obtain high propane retention with a low lean-oil circulation over the reabsorber.

5. Distillation.—Rich oil from the propanizer is pumped through lean oil-rich oil heat exchangers into the primary still which operates at about 200 psig. The oil is partially stripped with live steam and the residual oil is pressured through direct-fired heaters into the secondary still which operates at 50 psig. In the secondary still, the absorption oil is stripped of most of its absorbed components by means of live-steam agitation. Overhead products from the high and low-pressure stills are fed directly to the propanizer-demethanizer tower.

The propanizer-demethanizer operates as a conventional fractionator using reboiler heat at the base, but uses flashed condensate in place of reflux. The uncondensed vapors from the propanizer-demethanizer are recycled back to the base of the propanizer reabsorber to serve as cold stripping vapors. The product from the reboiler of the propanizer-demethanizer is the raw product and contains both condensate and the recovery from absorption operations.

6. Raw-product splitter.—The raw product is split into light and heavy ends by means of a debutanizer. The debutanizer is operated to remove all butane and lighter components not required for vapor-pressure control of the gasoline product. The tower operates at total condensation. Reboiler heat is supplied by a split stream of hot lean oil.

7. Light-ends fractionation.—Overhead from the debutanizer is fractionated into purity stock-tank products by cascade fractionation. The product is successively deethanized, depropanized, and deisobutanized. Due to the efficiency of the propanizer-demethanizer and the propanizer-reabsorber cycles, the overhead product from the deethanizer is about 95 per cent purity. Reboiler heat is supplied from 50-psig. tertiary steam system.

8. Heavy-ends fractionation.—Bottom product from the debutanizer is fractionated into stock-tank products by means of cascade fractionation. The product is successively stripped of gasoline-base stock, naphtha, kerosine, and absorption oil in separate dry fractionators. The fractionators each have reboilers heated by means of a Dowtherm system operated at 65 psig. and 650° F.

Auxiliary Facilities

In conjunction with the major process equipment, a number of auxiliary facilities have been installed. Some of these will be briefly described.

1. Casing-head compressor station.—The casing-head compressor station handles oil-well gas from 10-in. Hg vacuum to 1,050 psia. in four stages. The first stage is by means of two parallel steam - turbine - driven centrifugal compressors, each capable of handling 35,000,000 standard cubic feet per day. Reciprocating compressors of 1,600 hp. each boost the gas through the next three stages.

2. Cycle compressors.—Cycle - gas residue is boosted through 1,600-hp. reciprocating compressors through one stage to injection pressure. Two recompressor cylinders are used to boost some 1,000-psig. residue to cycle suction pressure.

3. Refrigeration.—Refrigeration facilities are provided to obtain high propane recovery. Refrigeration is by means of n-butane compressed with

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600-b.hp. centrifugal compressors running at about 7,000 r.p.m. Compressors are driven by 600-psig., 825° F. steam turbines operating full condensing.

Refrigeration is used to chill gas going to the casing-head (1,000 psig.) absorbers, oil going to casing-head and propanizer absorber, and to supply reflux to the deethanizer. Use of the refrigeration facilities boost propane recovery from guaranteed design value of 65 per cent (hot) to 75 per cent (cold).

4. Steam plant.—Steam is generated in 75,000-lb. per hour boilers operating at 600 psig. and 825° F. total temperature. The steam is utilized in the process area at 600, 250, and 50-psig. operating levels. Steam is expanded through turbines from the 600 to the 250, and from the 250 to the 50-psig. levels. Under design conditions, all steam is condensed in process at either the 250 or 50-psig. level. Primary steam at 600 psig. is used directly in the centrifugal compressor turbines which condense at 27-in. Hg vacuum.

Condensate from the steam systems is segregated as to clean and oil condensate. Oily condensate is treated for oil removal and commingled with the clean condensate and the two streams used for boiler feed. The feed is deaerated at about 35 psig. Boiler-feed makeup is supplied by evaporators.

5. Dowtherm system.—To supply heat to the high-temperature heavy-ends fractionator reboiler, a Dowtherm system is used. Dowtherm is evaporated in boilers of 65 psig. and condensed in the reboilers at approximately the same pressure and 650° F. The condensed Dowtherm is returned as liquid feed to the Dowtherm boilers.

6. Electric power.—Electric power for the plant is generated by means of 675-hp. four-cycle, engine-generator sets.

7. Cooling system.—Both water and aerial cooling are used. All heat exchangers using water are of the shell-and-tube type. Cooling tower is induced draft. Engine jacket water is on a separate closed cycle. Aerial condensers are utilized in the following condensing service: (1) isobutane, (2) gasoline, (3) naphtha, (4) kerosine, (5) absorption oil, and (6) excess steam.

8. Storage and loading.—The plant is equipped to store 5 days of design production with separate storage for each of the products normally made. Loading facilities are available for truck, rail, and pipe-line shipments.

9. Lead-blending plant.—Facilities have been installed, but not used, which permit the blending of a leaded motor fuel. Motor-fuel storage tanks are equipped with in-tank mixers to expedite the blending of motor fuel.

10. Fresh-water supply.—The fresh-water makeup to the plant is supplied by water wells drilled in the plant site. Water is produced from sands found at 2,400-2,500-ft. depth. The water is unusually soft, but has considerable carbonate, sulfate, and chloride salts in solution. Treatment is added to counteract carbonates and corrosion.

11. Water disposal.—The Seeligson plant is located in the midst of ranch lands with surface drainage almost nonexistent. Waste water from the plant (primarily cooling tower blowdown) is treated through the water-disposal plant and pumped into the injection wells located on the plant-site. Water is injected into salt water sands at about 3,000-ft. depth.

12. Dehydration facilities.—The residue gas from the 1,000-psig. absorbers is dehydrated in solid-desiccant dehydrators. Three towers are installed—two with activated alumina and one with S/V Sovabeads. Regeneration and cooling cycle is 8 hours, with two towers in parallel drying service at all times. Regeneration heat is 600-psig. steam. Towers are automatically switched by means of a time-cycle controller.

The Seeligson plant was constructed by Hudson Engineering Corp. Design was handled by Hudson Engineering Corp. working with the advice of a committee of engineers representing the various operators.

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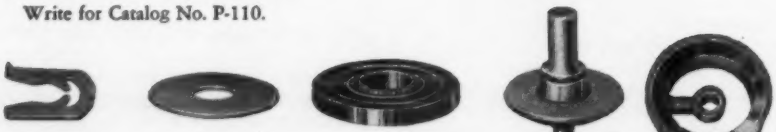

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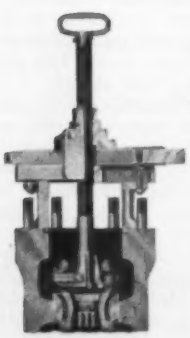

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Material-Balance Calculations

North Snyder Field Canyon Reef Reservoir

There was wide interest in the Journal's recent report on the latest reservoir data for the Scurry County, West Texas, fields (April 27, 1950, issue, pages 64 and 65). This report gives further details on the calculations presented to the Texas Railroad Commission at the Scurry hearing by Standard Oil Co. of Texas.

TO determine the theoretical reservoir performance of North Snyder field, material-balance calculations were made.

The basic equation for a solution-gas-drive reservoir having no original gas cap is as follows:*

$$L = \frac{Q\,(\gamma\beta + R - S)}{Si - S - \gamma\,(\beta i - \beta)} \qquad (1)$$

L = original oil in place, expressed as barrels of residual oil (that obtained by differential liberation from initial to atmospheric pressure at reservoir temperature, then cooling to standard temperature)

S = gas solubility by differential liberation, standard cubic feet per barrel of residual oil

γ = volume factor for gas, standard cubic feet per reservoir barrel

β = formation volume factor of reservoir oil by differential liberation, reservoir barrels per barrel of residual oil

Q = cumulative production, barrels of residual oil

R = cumulative produced gas-oil ratio, standard cubic feet per barrel of residual oil

i refers to initial conditions

Calculations were confined to the region where the free-gas saturation in the reservoir is less than 10 per cent of the pore space. A figure of about 10 per cent is generally recognized as the equilibrium-gas saturation of most formations, and is the gas saturation below which the effective permeability to gas is zero. The principal reason for not carrying the calculations out past 10 per cent gas saturation was that no reliable relative permeability data were available.

Since the permeability to gas is zero in the range under investigation, the produced gas-oil ratio is merely the solution ratio. Therefore, the cumulative produced gas-oil ratio, R, required in Equation 1, can be expressed thus:

$$R = \frac{Q'R' + \Delta Q\,(r)}{Q' + \Delta Q} \qquad (2)$$

ΔQ = production between two pressure points, barrels of residual oil

r = average gas-oil ratio between two pressure points, standard cubic feet per barrel of residual oil

Primes refer to preceding pressure point

Let L = 1, so that Q and ΔQ are expressed as fractions of original oil in place. Substituting Equation 2 in Equation 1 results in:

$$\Delta Q = \frac{[(Si - S) - \gamma\,(\beta i - \beta) - (\gamma\beta - S)\,Q' - Q'R']}{\gamma\beta - S + r} \qquad (3)$$

Equation 3 was solved for various pressure points, using the bottom-hole sample data on Standard 2-1 J. W. Brown. The initial reservoir pressure, measured in this same well on November 23, 1948, and calculated to a datum of —4,300 ft., was 3,112 psig.

The results were tabulated and plotted. Since the oil is undersaturated at the original pressure, production will be by liquid expansion until the saturation pressure of 1,725 psig. is reached. At that point, the calculations show that 1.89 per cent of the original oil in place will have been produced.

As production continues, gas begins to come out of solution, and the pressure decline is substantially retarded, as indicated by the flatness of the curve in the region below the saturation pressure. This gas that comes out of solution is not produced and does not tend to segregate itself by gravity from the oil phase, regardless of structural conditions, because the gas saturation is below the equilibrium-gas saturation and the effective permeability of the formation to gas is zero. The produced ratio is therefore equal to the solution ratio at the existing reservoir pressure.

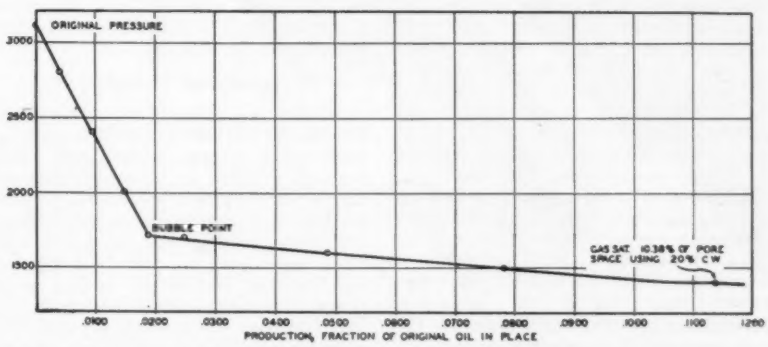
At a reservoir pressure of 1,400 psig., the free-gas saturation in the reservoir will have reached 10.38 per cent of the pore space (using 20 per cent connate water saturation). This is calculated from the following equation:

$$\rho g = (1 - \rho w)\left[\frac{\beta i - \beta\,(1 - Q)}{\beta i}\right] \qquad (4)$$

ρg = gas saturation, fraction of pore space

ρw = connate water saturation, fraction of pore space

To summarize, material-balance cal-



Results of material balance calculations, North Snyder field, Canyon Reef reservoir.

*Refer to Muskat, "Physical Principles of Oil Production," par. 9.5, p. 378.

TABLE 1—RESULTS OF MATERIAL-BALANCE CALCULATIONS, NORTH SNYDER FIELD, CANYON REEF RESERVOIR

p pressure (psig.)	β F.V.F., bbl. rsvr./ bbl. residual	γ Gas vol. factor, std. cu. ft./bbl. reservoir	S Solution G.O.R., std. cu. ft./bbl. residual	r Average G.O.R. during interval, std. cu. ft./bbl. residual	ΔQ Production during interval fraction of orig. oil in place	Q Cum. production fraction of orig. oil in place
3,112	1.4235	...	885	885	....	....
2,800	1.4290	...	885	885	.0038	.0038
2,400	1.4370	...	885	885	.0056	.0094
2,000	1.4446	...	885	885	.0053	.0147
1,725	1.4509	...	885	885	.0042	.0189
1,700	1.4468	708	876	880	.0058	.0247
1,600	1.4303	663	842	859	.0239	.0486
1,500	1.4139	618	807	824	.0297	.0783
1,400	1.3978	574	772	790	.0355	.1138

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culations for North Snyder field show that the pressure decline will be proportional to cumulative production until the reservoir pressure reaches the saturation pressure of 1,725 psig., at which time 1.89 per cent of the original oil in place will have been produced. At this point, the curve will flatten out considerably (see Table 1).

The equilibrium gas saturation of 10 per cent will not be reached until the reservoir pressure declines to about 1,400 psig., at which time over 11 per cent of the original oil in place will have been produced. Until this time, the gas-oil ratio will be approximately the solution ratio, and the free gas evolved from solution will not tend to segregate from the oil by gravity, regardless of structural conditions.

War-Products Plant

(Continued from page 69)

unit. This stock represents about 45 per cent of total fresh feed for this unit, the remainder comprising light virgin gas oil from the topping units. DAGO, being a very heavy gas oil, tends to produce a high catalytic coke yield and contaminates cracking catalyst rapidly. Thus, charging all DAGO to one unit limits catalyst contamination to one bed.

Prior to the Cit-Con operation, one-third of the total gas-oil cat feed stock in the refinery comprised this deasphalted residual fraction, and its restriction to one unit became a major problem. A solution was found in modifying the reactor stripper. The catalyst level in the central stripper was dropped below the reactor bed level and catalyst spilled over the edge of the stripper cylinder. This brought a notable improvement in stripping, due mainly, it is believed, to the elimination of mixing stripped and unstripped catalyst at a common bed level. Reduced reactor holding time also contributes. The modification relieved the combustion load in the regenerator, a limiting factor in the unit's capacity, by reducing both coke formation and hydrocarbon carryover from the reactor. Another contributing factor to increased throughput was the addition of air for regenerators. Engineering studies involving other stripper design for A unit are progressing with promise of further improvement in the operation.

A minor increase in fresh feed charge to the A unit is accomplished by introducing 2,000 bbl. per day of DAGO to the primary fractionator. This results in replacement of a cracked fraction with fresh DAGO charge in the slurry stream which returns entrained catalyst to the reactor, and at the same time amounts to net additional preheat to unit feed. Engineers find that this practice results in no contamination of light cycle oil, as it goes directly to the C unit for further cracking.

Due to the high degree of contamination, catalyst makeup is kept high in the A unit. Reject catalyst from both B and C units is charged to the A unit together with an equal volume of fresh natural catalyst. This makeup balances the average of 25 tons per day withdrawn or lost from the unit to flush out contaminated catalyst and control hydrogen, gas, and coke production.

The B unit processes almost exclusively all of the virgin heavy gas oil from the topping units. This ideal situation, possible in a balanced program involving more than one cat unit, has resulted in one of the most successful cat cracking operations in the industry. The heavy gas oil undergoes high conversion at low space velocity and reasonably low reactor temperature. It produces a maximum yield of butanes-butylenes and debutanized gasoline and highest-quality light and heavy cycle stocks. The only recycle to the reactor is the slurry stream. Some virgin light-gas-oil makeup may be added to the feed charge to load up the unit.

The C unit processes all heavy cycle oil from the other two units. This unit may also charge furfural and Duo-Sol extracts from Cit-Con, as well as refinery slop. Enough light recycle oil and virgin light gas oil are added to load up the unit. For this more severe operation, both catalyst activity and reactor temperatures are kept high. Heavy cycle oil from this unit is recycled almost to extinction and slurry oil is cycled to complete extinction. Light cycle stock is not generally returned to the reactor, being regarded as marginal cat cracking feed because of the market for No. 2 fuel oil.

Improved Stripping

Both B and C units are sufficiently flexible to convert to the functions of each other during turnaround. This is made possible to a revised stripper design such as that shown for C unit in Fig. 2. A combination of orifices and doors in the stripper shell will allow operators to maintain reactor and stripper bed levels over a wide range. The series of 36 orifices totaling 7.45 sq. ft. spaced around the stripper cylinder at the level designated "X," admits catalyst to the stripper at a rate which maintains the top of the reactor dense bed about 3 ft. above the stripper bed level. In addition, two doors located at opposite sides of the cylinder at level "Y" will allow dropping the reactor bed level to 8 ft. above the grid. This design combines the improvements of two-level stripping with a wide flexibility in reactor-bed depth and allows the C unit to operate successfully on either A or B feed stock. The stripper in the B unit is identical to that in C except for the orifices at "X."

In general, the following conditions obtain in the three cat units, in normal operation:

Unit	Reactor temp. (°F.)	Reactor space velocity (tons/hr./ton)	Catalyst-oil ratio (wt./wt.)	Reactor-bed depth (ft.)
A	905	11.1	5.9	8
B	870	2.9	6.2	26
C	900-920	4.7	6.4	15.5

Other Modifications

A seventh air blower has been added to the cat cracking section providing combustion air to the three units through a common manifold. The unit is capable of delivering 285,000 lb. of combustion air and 5,000 lb. of precipitator air hourly to the three units. A gas compressor has been converted to operate on air in the winter and gas in the summer.

Pump capacities in the three units were increased where necessary by changing to high-powered turbines, Injection nozzles to the reactor feed lines have been increased from the original 6 to a total of 10. Fractionators have been modified by trimming the disk and doughnut baffles to reduce pressure drop through the towers.

Cat Fractionation

In the light ends, or cat fractionation section which serves all three cat units, the total daily load has expanded to 35,000 bbl. of liquids and 42,000 M.c.f. of gas (C$_4$ and lighter). The original unit consisted of an absorber, a lean-oil still, a splitter, depropanizer, debutanizer, and retreat fractionator. The splitter has been converted to a rerun tower. Where originally only two gasoline streams were withdrawn from the section, now the rerun tower overhead and side streams plus debutanizer bottoms provide three gasoline streams which aid in blending to specifications. In addition, the unit produces propane and lighter for fuel gas, propane-propene for alkylation, butane-butenes for butadiene manufacture, and a 430° F.+ tractor fuel or No. 2 fuel oil.

Expansion of operations required the increase of some pump capacities, rearrangement of exchangers, additional steam reboilers, overhead condensers, and a few minor changes on the internals of the towers to step up the absorption rate. This cat fractionation section receives condensate from the thermal unit, comprising propanes, butanes, and small amounts of pentanes. As stated previously, it also processes formerly vented gas from the topping units.

Scale and sludge, which tend to accumulate in the depropanizer column and absorbers, are removed regularly by periodically introducing water to the top of the column and withdrawing water and dissolved foreign matter from the bottom. This water and wash takes place during operation but is not sufficient to keep the unit on stream indefinitely.

About every 8 months the depropanizer is bypassed and chemically cleaned in 1 day by contractors. During its shutdown the debutanizer acts as a depropanizer and makes a mixed C_3-C_4 stream that is charged to the alkylation unit.

Alkylation

The two cold sulfuric acid alkylation units were designed to produce butyl and pentene alkylates which blended with base stocks would amount to 16,000 bbl. of high-quality aviation gasoline per stream day. During the closing months of the war, a peak of 25,000 bbl. per stream day was reached on aviation gasoline. Now the alkylation plant is operating at only a fraction of wartime capacity, making propylene and some butylene alkylates.

The butane isomerization unit, which produced isobutane for alkylation during the war, is now no longer required and part of the plant has been converted to a Girbotol treating unit.

The government-owned butadiene plant, adjacent to the basic refinery, is being operated by Cities Service at partial capacity for the present.

Treating

Volume expansion of the refinery and introduction of sour West Texas crudes combined to make widespread changes necessary in the treating section of the plant. Five units comprised the original centralized treating section. Straightrun isopentane, butanes, butenes, and a pentane-150° F. fraction were treated for mercaptan removal in a regenerative-caustic unit. A Unisol plant treated straightrun gasolines. Treaters for aviation base stock, kerosine, and furnace oil completed the section.

A third absorber and an additional prewash tower were added to the Unisol unit, and important changes are being made in absorber design. One absorber tower has been emptied of Raschig-ring packing and pierced plates were installed. A second absorber tower will be converted to jet contacting.

To meet doctor-sweet test, a hypochlorite aftertreat was added to all Unisol streams and to some regenerative caustic-treated products. Kerosine treating comprises doctor sweetening, acid treating, clay contacting, and filtering. Three settlers originally used in the furnace-oil treater were transferred to the kerosine unit, and four new contact towers and a second clay filter were added to handle the almost two-fold increase in straightrun kerosine production.

New Furnace-Oil Unit

Furnace-oil treating was transferred to two 10,000-bbl. tanks in the intermediate storage area. After caustic and water wash, the product is settled in the first tank, decanted, and water washed before final settling in

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the second tank. Treated oil then passes a gravel-packed coalescer and rock-salt drier and, with a metal deactivator added, moves to finished storage.

An additional treating unit for what is termed "blend oil" has been added to the section. This very heavy naphtha - kerosine cut from West Texas crudes is acid treated with spent alkylation acid, given a caustic wash and water wash. This stream, amounting to 5,000-7,000 bbl. per day, is used to blend furnace-oil base stock for front end volatility of No. 2 fuel oil. The treating unit consists of a reflux drum relieved from use in the cat fractionation unit. An internal head divides the drum into the acid and caustic settlers.

Plant at Maximum Capacity

For the present, the refinery is operating at about its peak of capacity for the type of operation now obtained. As in other refineries, crude throughput is dependent to a large extent on the ratio of distillate fuel to gasoline. Should the present high distillate fraction be reduced, refinery capacity would decline accordingly. Reversion to the type of operation for which the refinery was designed would essentially reduce crude capacity to an estimated 100,000 bbl. per day, somewhat higher than original capacity due to addition of desalting, the Cit-Con operation and other new facilities added to the plant since war's end.

The program of adapting the new refinery to optimum market demand continues. If future markets require greater product volume, the plant will be expanded to conform, by further investment in processing facilities.

Wildcat Drilling in 1949

(Continued from page 77)

1949 exploratory drilling in the United States is the big gain over 1948. In 1948, 8,013 exploratory holes were drilled, and in 1949, 9,058 such holes were drilled. If this campaign should continue to expand through 1950, we may have a total for this year of more than 10,000 such holes. However, it remains to be seen whether threats against depletion allowance will have a damping effect on the industry's efforts to find new oil. In this connection Table 5 is most interesting, for it clearly demonstrates that, on the average, during the last 6 years, for every producing new-field (rank) wildcat, 7.85 additional dry holes had to be drilled. For every foot drilled in "successful" new-field wildcats, 6.12 ft. were drilled in dry new-field wildcats. In other words, for the 12,697,431 ft. drilled in 2,428 successful wildcats in the 6 years from 1944 to 1949, inclusive, the industry drilled 77,741,298 ft. in 19,061 dry new-field wildcats. And let no one forget that relatively few of the so-called "successful" wildcats discovered major fields. Many were on the border line between economic success and failure. These are significant facts which should be considered by those who, directly or indirectly, would stifle the industry's ambition for exploration.

BOOKS

NATURAL GAS AND NATURAL GASOLINE. By R. L. Huntington. Published by McGraw-Hill Book Co., 330 West 42nd Street, New York 18. 598 pp. $8.

The purpose of this volume is to give a general idea of the natural-gas and natural-gasoline branches of the petroleum industry; to provide text material for students of petroleum, natural gas, chemical and mechanical engineering; and to provide the process and equipment designer with a practical knowledge which the author has gained through his actual field and plant experience. The author includes such topics as the production and transportation of natural gas from the well, condensate and dry-gas fields, and the recovery of natural gasoline from the gas, its storage, and transportation. He shows how a few fundamental principles can be applied to the solution of many practical problems involving the design and operation of gas-gathering and natural-gasoline-recovery systems. The practical approach is stressed, and the case method is used freely to clarify the meaning of laws underlying various operations. Recent advances in gas condensate cycling, oil absorption, fractionation, gas dehydration, etc., are discussed and many illustrative examples are worked out to clarify the presentation of certain points.

PETROLEUM HORIZONS. Published by The Lummus Co., 420 Lexington Avenue, New York 17. 80 pp.

Objective in publishing this volume was to provide a manual covering petroleum-refining, petroleum-chemical, and chemical-manufacturing activities, with a high degree of reference value. The book employs color in a pleasing, functional way to reproduce 31 flow diagrams of petroleum-refining and petroleum-chemical processes. The diagrams contain typical operating data to further enhance their utility value. Accompanying text discusses technical, economic, and other phases of each process. Many photographs, bar charts, and drawings add to the visual helpfulness of the book. The book is intended for gratis distribution.

A HISTORY OF STEEL CASTING. Prepared under direction of William H. Worrilow. Published under auspices of District No. 1, Steel Founders' Society of America, Philadelphia. Edited by Arthur D. Graff. 168 pp. $2.50.

This volume includes a general history of the ferrous foundry industry, and reports on the origin of steel castings in Germany, Switzerland, England, and the United States. There is a detailed primer of steel-casting production covering original methods and advances subsequently effected in furnace practice, process, molding, pouring, pattern making, cleaning and finishing, testing and inspection, and the wide variety of steel castings now available. The book is illustrated by nearly 50 photographs, drawings, and sketches.

1950 APPENDIX TO A.S.T.M. MANUAL OF ENGINE TEST METHODS FOR RATING FUELS. Published by American Society for Testing Materials, 1916 Race Street, Philadelphia. 32 pp. $1.

This appendix, prepared by the Division on Combustion Characteristics of A.S.T.M. Committee D-2 on Petroleum Products and Lubricants, includes changes through 1949 in the 1948 Manual of Engine Test Methods for Rating Fuels.

design

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When seamless drawn welding tees were introduced some 17 years ago, they represented a great advance over cut-and-welded intersections. Even so, they still had certain inherent weaknesses. Their design was unstable under high internal pressure and bulging resulted at the flat spots of the side walls. The relatively weak crotch area, carrying an unequal share of the load, usually gave way first in bursting tests. To compensate, tees were made excessively heavy.

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40	4440 psi	5950 psi
80	6845 psi	8625 psi

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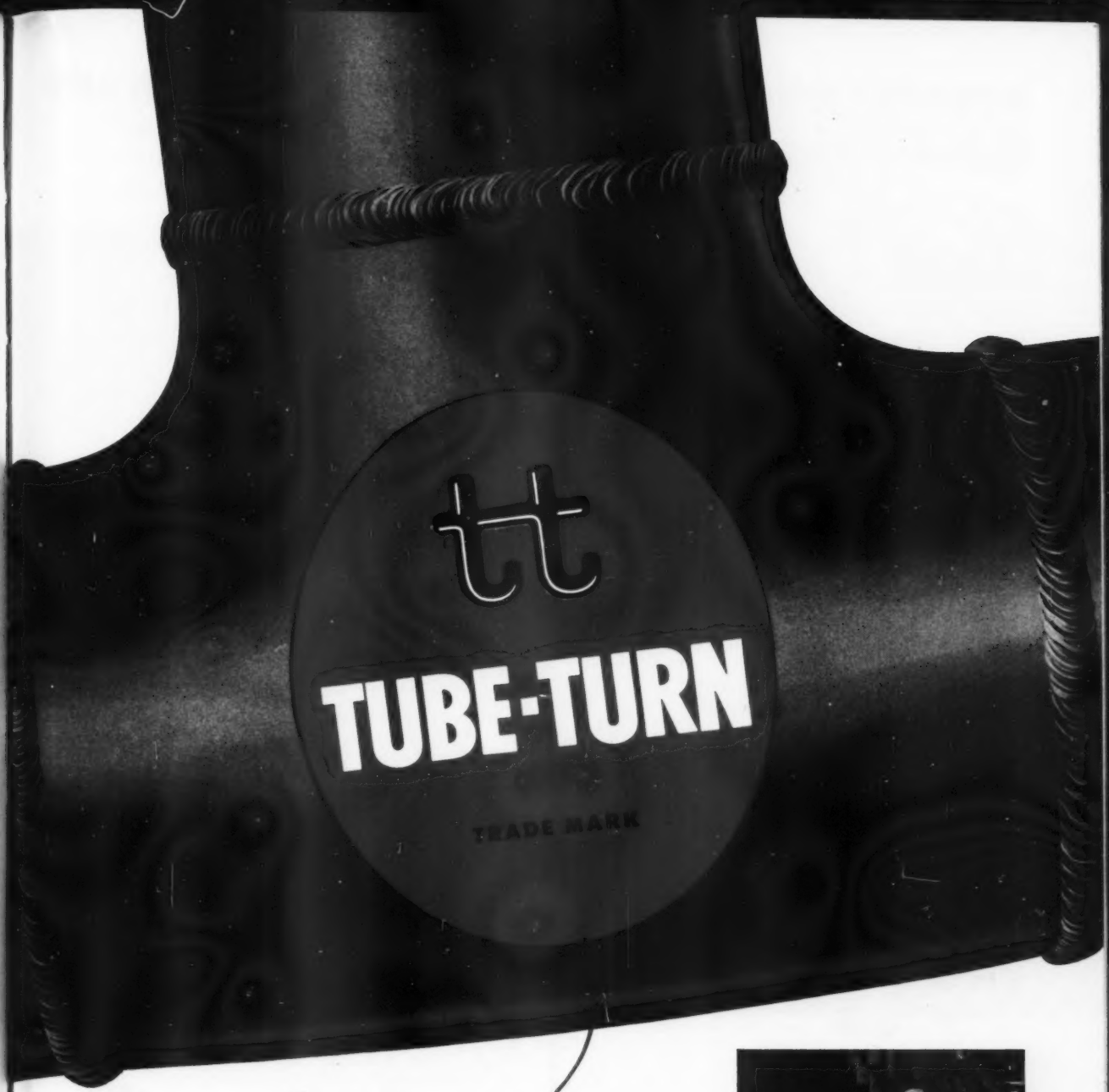

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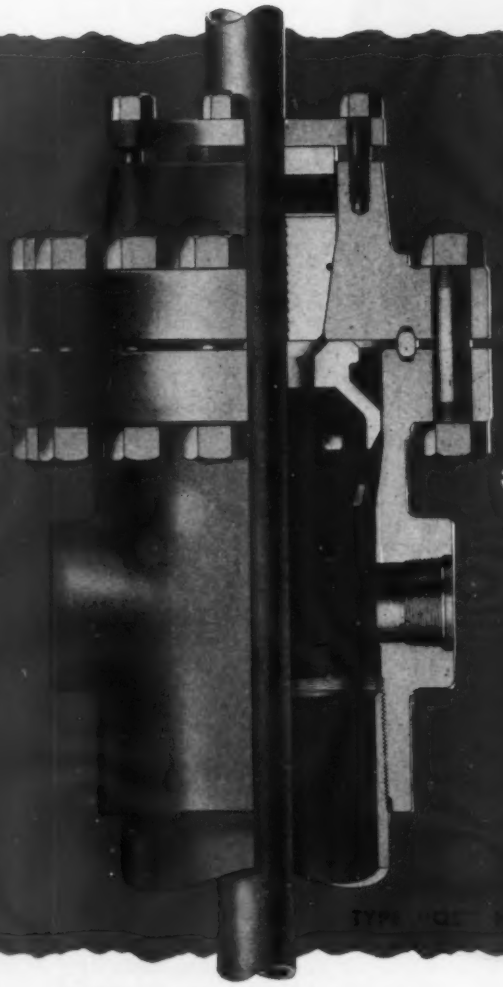

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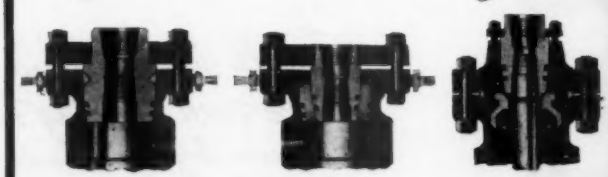

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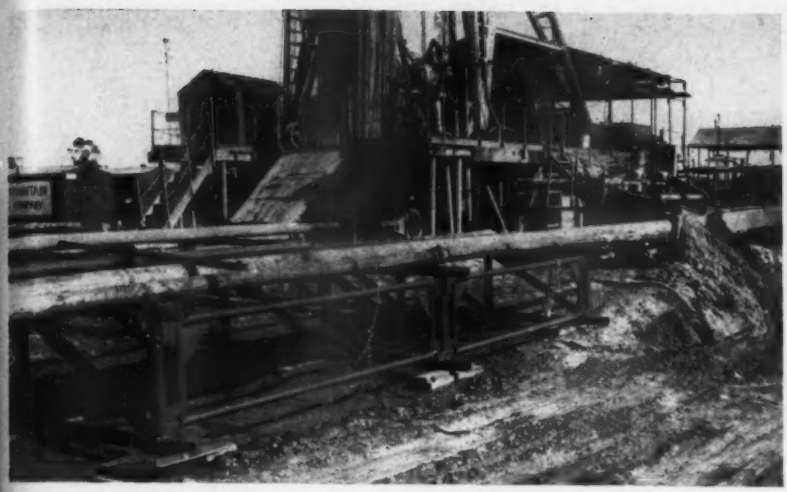
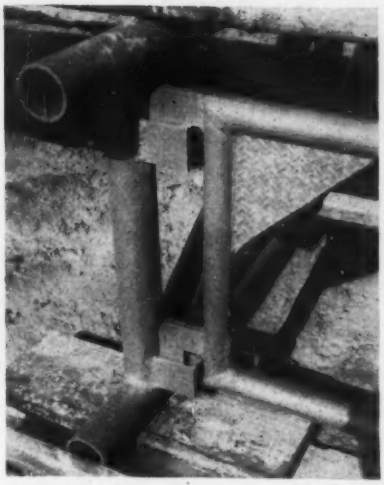


NEW PIPE RACK.—Installed by Rocky Mountain Drilling Co.: rig on a Southern California well location.



CLOSEUP.—Photo shows end panel in pipe rack and method of attaching end section with heavy lugs. Rack panels rest on timber cribbing to support the weight on ordinary soil.

Pipe Racks and Mud Ditches Redesigned to Increase Efficiency of Drilling Rig

TWO major improvements have been made in the past few weeks on drilling rigs in southern California operated by Rocky Mountain Drilling Co. First are the pipe racks. These have been redesigned to obtain compactness of loading when moving with trucks, and to provide stability for supporting the load of drill pipe and casing used at the drilling well. Second is the mud system, which has been equipped with twin flumes, or steel mud ditches paralleling each other from the shaker tank to the mud pump suction pit. Either ditch may be cut out of service for cleaning without hampering the adequate flow of drilling fluid from the shakers to the circulating pumps.

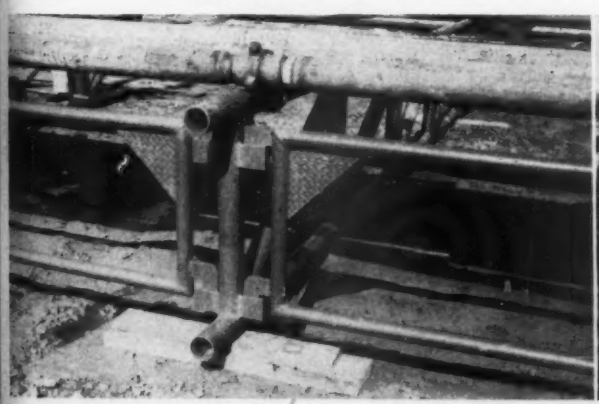
The walkway structure used by Rocky Mountain on all of its rotary rigs was designed a couple of years ago as a long box-like unit with 4-in. pipe for the frame to attach sheet steel covering the sides and bottom. The lid, or the true walk is a hinged unit made in sections for ease in handling and is used both as the walk and a cover for the tool compartment inside the walk structure. The major portion of the walk is floored with common undressed 2 by 12's attached to the lid frame with carriage bolts countersunk below the surface.

The pipe racks on each side of the walk structure have been designed to attach to the top and bottom sills of the walk with lugs and retaining pins so as to form a single unit when both racks are assembled.

The rack supporting sections for drill pipe and casing are made of drill pipe as flat panels so that when the six sections making up both structures are loaded on a transport truck the vertical space occupied is somewhat less than 30 in. This feature tends toward concentrating the load and more tonnage can be hauled with one truck than could be done if the rack had been made in box-like sections, or with inverted tee footings.

The panels on each side of the walk

CONNECTING PANELS.—These are joined at end sections with heavy lugs without bolts.



BOX-TYPE WALKWAY.—Located between pipe racks. Note method of joining rack panels to sills of walk.

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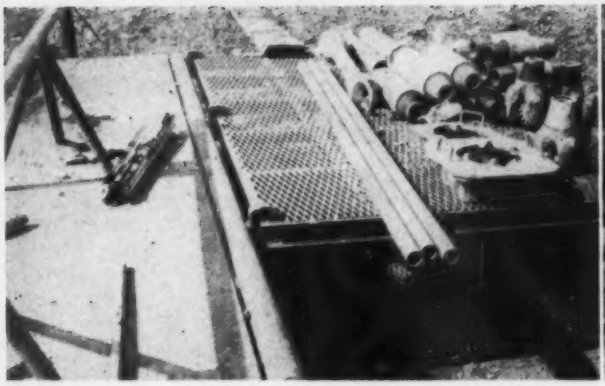
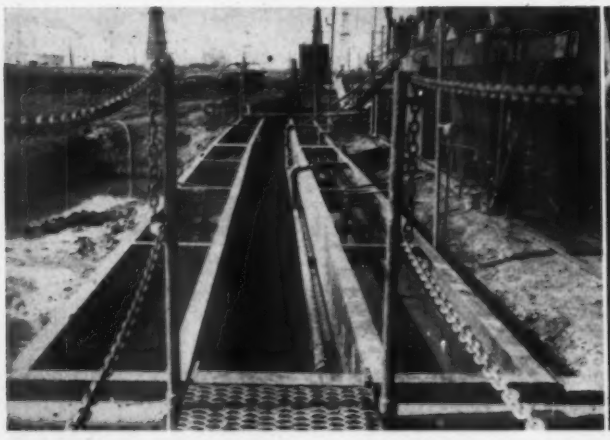
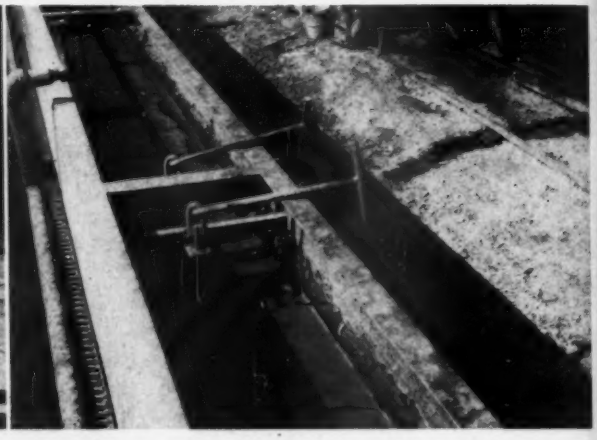


FOLDING PLATFORM.—Provides handy space for subs and drilling bits. It is attached to side of walk section with hinges.

ALL-STEEL MUD SYSTEM.—This design recently has been installed by Rocky Mountain Drilling Co. on all its rotary rigs.



TWIN MUD DITCHES.—These steel units, with grated walk between, are equipped with irrigation-type gates.



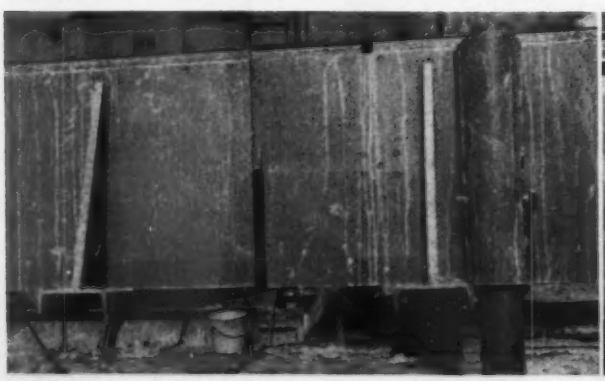
IRRIGATION-TYPE BLOCK GATES.—Operation is via link connected handle. Handles can lower into ditch when transporting.

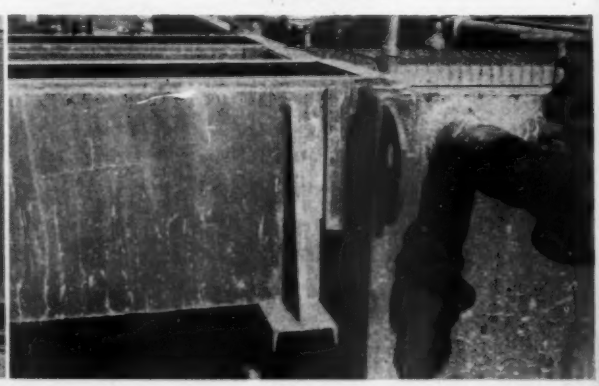
are fitted with fastening lugs at the top and bottom of the end riser to fit into a clevis-like fitting welded to the bottom and top sills of the walk. Holes are provided for securing the two connections with heavy pins to prevent separation of the entire unit. The center panels of the rack sections have box-like receptacle welded to the end risers on both sides to attach the spacer panels which hold the rack panels in a vertical position.

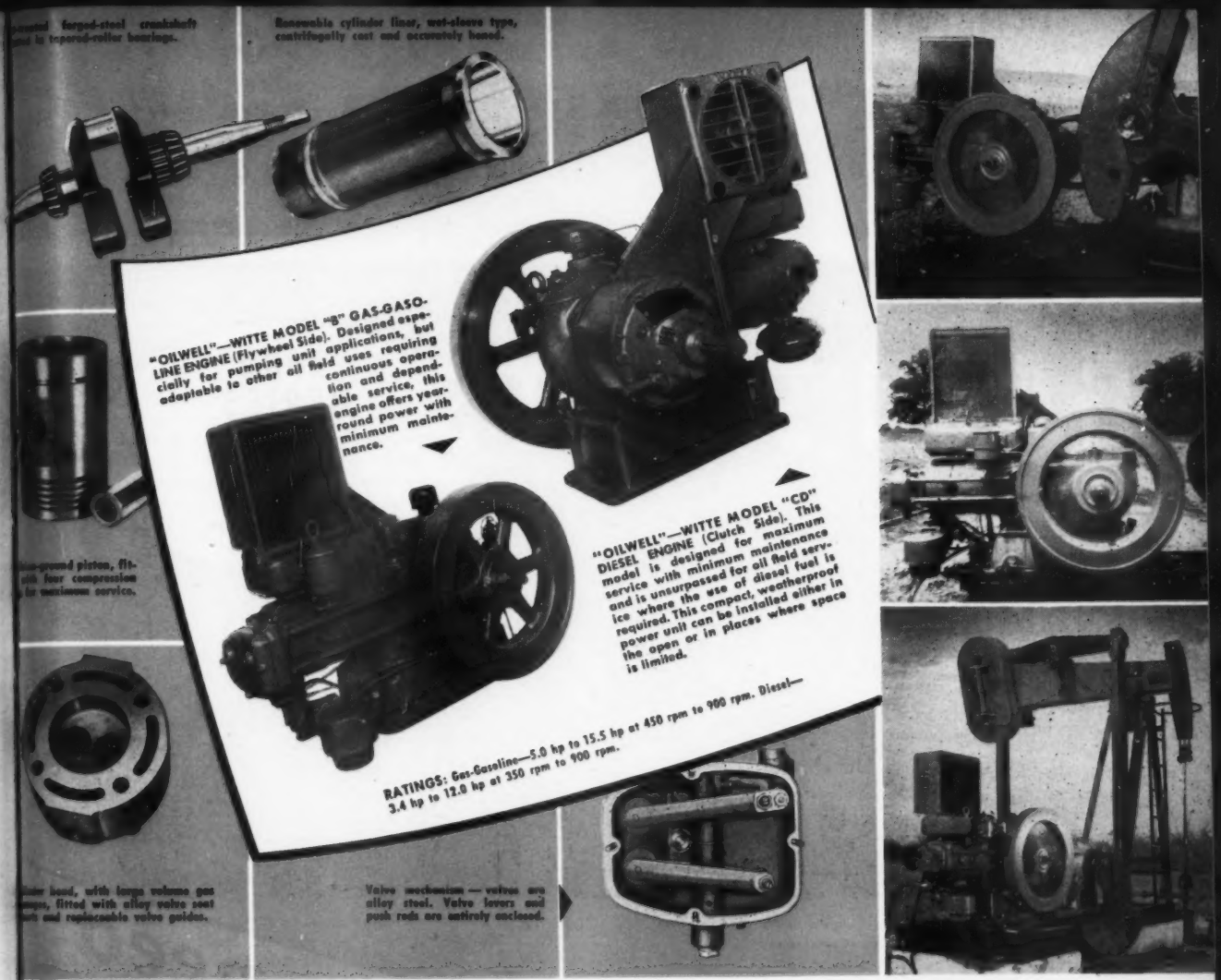
The spacer panels are made of 2-in. tubing with identical end fittings so they may be used at any point in the rack structure without numbering or the necessity of selecting a particular part when rigging up. Each top corner of the spacer panels is reinforced with a triangular gusset plate to prevent bending or the panel becoming deformed when the rack is loaded with pipe. The hooked connectors on the spacers are slightly tapered to provide a clamping effect when the unit is assembled, driven into the supporting panel lugs with a hammer, and disassembled by driving upward to loosen. The rack members are set on timber cribbing for leveling

SIDE VIEW OF MUD TRENCHES.—Construction of jointed ends of two sections showing overflow raised above center to allow for settling space. Joining is similar to end connected to mud tank.

MORE DETAIL.—End construction of mud ditch and method of connecting to mud tank with lip guides and caulking with tarred rope or braided packing.



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and to support the load of pipe on ordinary soil without settling.

An unloading dock is attached to one side of the all-steel walk at the end near the highline post so that subs, bits, and other small tools can be stored. These may be picked up with the catline and brought into the derrick, or loaded on a dolly for moving. This dock is hinged to the walk section and is supported at the other side with posts, also hinged, and fitted with flat steel footing plates.

A landing platform is attached to the derrick end of the walk so the stairway can be placed at one side of the derrick instead of walking up and down ladders to move from the walk to the derrick floor. The entire unit was designed to provide ultimate compactness for hauling, rugged stability when in use, and ease and dispatch when tearing down or rigging up so as to reduce down time.

New Mud System

The mud system includes the conventional steel shaker tank and mud pit, both of which are equipped with dump gates for quickly unloading a current type of mud when a change is required to control formations penetrated. The two mud ditches are all steel and ditch composed of two sections. Tank steel is employed for sides and bottom and the unit is reinforced at the top with wide angle iron. The sections are further reinforced with a piece of wide channel iron as a transverse member near the ends, welded to the bottom of the ditch and the sides stiffened and braced with a long tapered triangular piece of heavy steel plate welded to the extended ends of the transverse member and to the tank steel sides.

The downstream ends of the ditches are supported by the mud-pump suction tank. Sections were removed from the top side of the tank so the end of the ditch might enter, and rest against, sides and bottom, on retaining plates. These plates are of adequate width to allow caulking with tarred rope or braided packing so as to provide a fluidtight joint.

The upstream ends of each section nearest the mud tank are fitted with pipe sleeves, braced and drilled to receive supporting posts which have matching holes to allow for uneven ground to level the ditch.

Each end of all sections is made with inlet and outlet to occupy only one-half of the depth of the section so to supply the necessary area in the bottom of the ditch for precipitation of the heavy material to be separated from the drilling fluid, which passes through the screens of the shakers.

Dump gates are built into the sections so that the accumulation of undesirable mud particles can be unloaded. Either of these ditches, or both, can be used in ordinary operation, but are controlled with the height of the irrigation type cutoff gates. Therefore, one ditch can be shut off immediately for cleaning and flushing without shutting down the pumps.

The adjoining ends of each section are made sleeve type, similar to the connection of the downstream end with the mud-pump suction tank, or pit. The extended part of the upstream section fits snugly into the upstream end of the last section, and the joint caulked to prevent leaks. Caulking is done when the ditches are being assembled by simply wrapping the sealing material around the end of the ditch as it is lowered into the receiver end of the downstream section.

The dump gates are provided with vertical shafts, attached to the top side, as irrigation weirs, and extending through a guide as a retainer. A handle is attached to the shaft with a double-eye fitting that acts as a universal joint and so the handle can be turned and lowered into the ditch when moving, which prevents having to disconnect any part of this fitting.

Since modern rigging methods include the use of a motor crane or a truck with a winch-operated boom, provisions are built into the ditch sections for attaching slings or hooked bridles. Holes are cut in the long triangular stiffening braces to allow handling without employing the precarious method of throwing a half hitch around the section for lifting.

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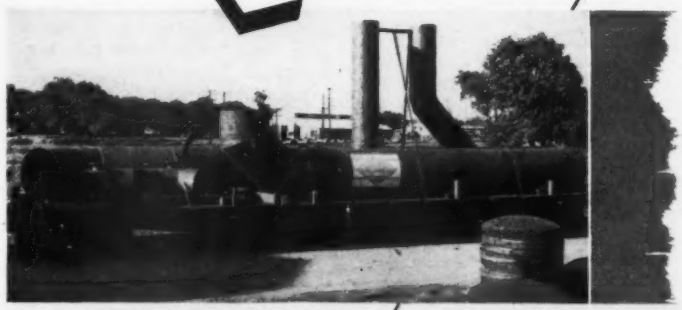

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Progress Report on a

Subsurface Oil-Well Flow Meter

by M. Stephenson*

IN order to obtain reasonably accurate information on the positions and relative importance of zones of entry of fluids and gas into prolific limestone wells, in a simple and inexpensive manner, a subsurface flow meter was designed in Venezuela in 1946 by engineers of Shell Caribbean Petroleum Co.

No thoroughly practical or suitable method of making permeability surveys was available, or in sight, when the problem became of pressing importance, so a simple design was developed (patent applied for) for a self-recording subsurface oil-well flow meter of the impeller type. It is run through tubing on an ordinary wire line. It measures flow speeds down to 10 cm. per second. This design was approved as a basis for a trial model.

The extent of the problem which was met may be roughly gaged by considering that the average thickness of the reservoir rock open in these western Venezuelan wells is about 1,600 ft., and that the potentials of individual producers vary erratically between very wide extremes, from say 20,000-30,000 bbl. per day, down to less than 300 bbl. per day, depending on their location and other factors. Well-head flowing pressures are of the general order of 100 to 2,500 psi.

It is important for permeability surveys to involve a minimum of interference with the production of the wells. Furthermore it is desirable that any subsurface equipment used in these surveys be relatively cheap so that its loss in a well would not be a serious matter, and it could be simply written off without the need for expensive fishing.

The completed flow meter reached Venezuela in the latter half of 1947 and after a series of trials it was proved a thoroughly practical oilfield instrument. It has now been accepted as a regular production tool for wells producing over 1,000 bbl. per day, and surveys of the bigger wells are in progress on a routine basis, as needed for workovers or reservoir investigations. These surveys have all been successful. The instrument was constructed in Shell Oil Co.'s exploration and production-research laboratory, Houston.

*Exploitation engineering department, Shell Caribbean Petroleum Co., Maracaibo, Venezuela.

Description

The trial-model flow meter has a maximum over-all diameter of 1⅞ in., and is about 3 ft. long.

The instrument consists of three main sections, together with centralizer springs. The lowermost unit houses the impeller and impeller shaft, which are directly rotated by a portion of the production flowing up the well.* Above the impeller unit is the transmission and reduction-gear unit which by means of a magnetic coupling transmits the rotation of the impeller shaft through a stainless-steel wall into the pressure-tight portion of the flow meter, and then reduces the speed of rotation by 3,600:1—considerably increasing the available torque.

The recording unit is screwed above the transmission unit, completing the pressure-tight portion of the instrument. It contains the recording stylus which is coupled directly to the reduction gear of the transmission unit, also the chart holder, and the chart-traverse mechanism. The flow meter is suspended by an ordinary Halliburton wire line attached to the top of this unit.

In the trial model the chart traverse is directly geared to the stylus shaft,

*This portion may only be very small, e.g., about 3 to 4 per cent in the case of an 8½-in. hole.

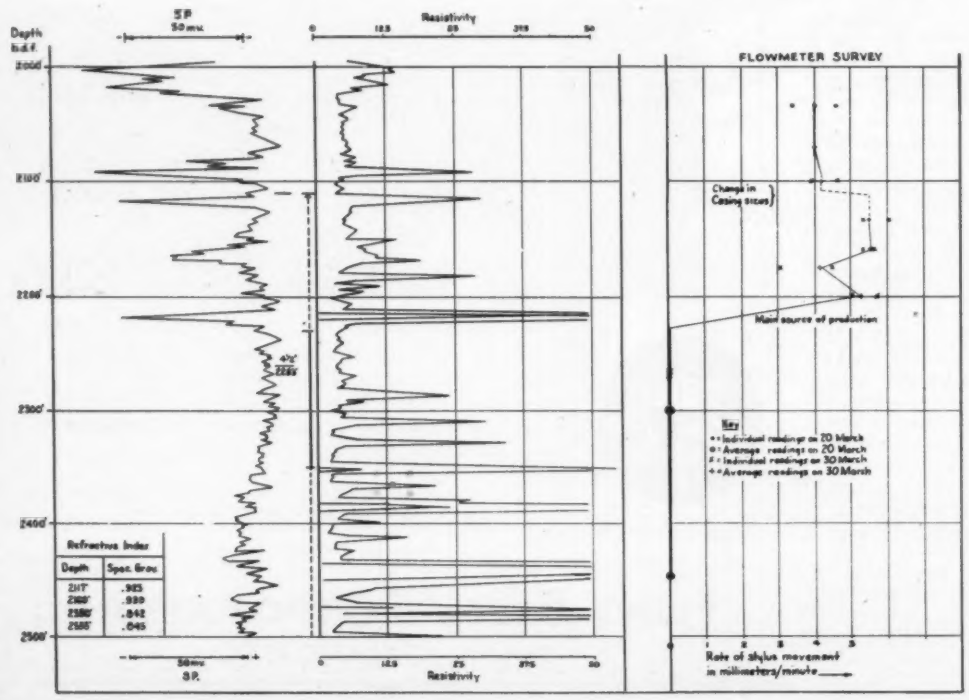

Chart of Shell-Stephenson subsurface oil-well flow-meter survey, together with standard electrical log of the same Venezuelan well (at left). Casing, 5-in. 13-lb., is set at 2,110 ft., g 5 by 4½-in. swedgé 2,110-11 ft., a 4½-in. liner at 2,110-2,883 ft., perforated 2,111-2,230 ft., 2,351-2,699 ft., 2,792-2,883 ft. Flowing temperature at 2,477 ft. = 121° F. Calculated density of gas-oil mixture at 2,100 ft. = 0.06 gm./cc. Calculated flow speed at 2,100 ft.—approximately 105 cm. per second.

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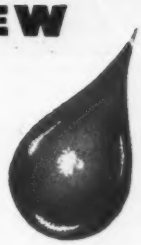

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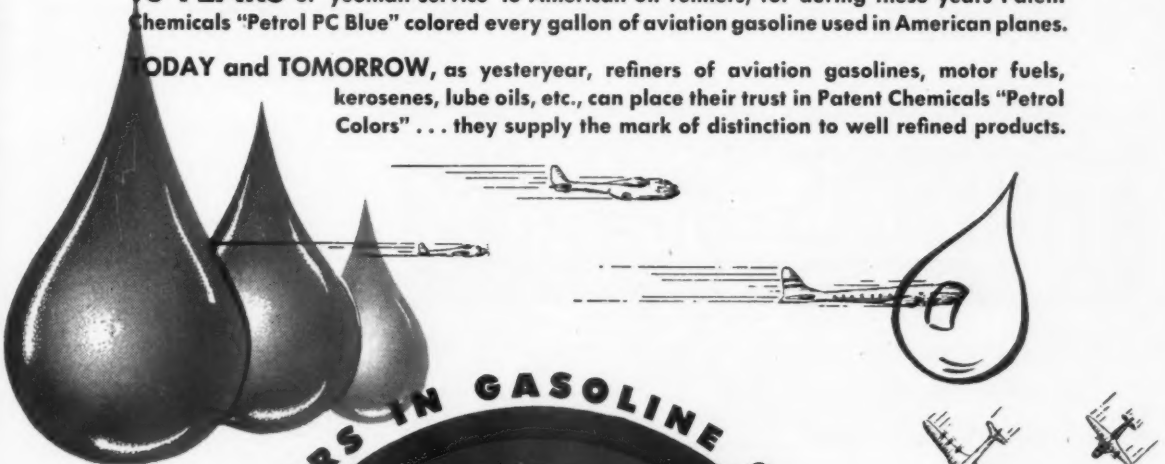

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so that there is no need for a clock, and time intervals are recorded by a spudding system. Jerking the instrument is accomplished at the beginning and end of each interval of time by allowing the wire line to run out freely from the reel about 2 ft. and applying the hand brake sharply.

The intervals of time are identified by adding extra marks according to a prearranged code. This is quite practical in the prolific limestone wells and enables accurate measurement. However, it has also become apparent that the recording unit may be quite easily replaced by the timing and recording section of an Amerada RPG3 subsurface pressure gage. Experiments with this have been started in Venezuela.

The rate of rotation of the stylus is a measure of the velocity of the fluid in the well, and the two quantities may be related by means of a calibration with water. This is almost linear, and there is only a small zero correction.

Measurements indicate close agreement with the water calibration, unless the gas-oil mixture is very light. However, for practical purposes an exact calibration is seldom necessary since most problems may be answered by means of a relative-permeability profile constructed directly from the rate of stylus movement at various depths, especially if read in conjunction with a bottom-hole flowing-pressure survey.

The useful range of the instrument as now constructed covers fluid-flow rates from about 10 cm. per second to some 2 or 3 m. per second. This would mean from say 100 bbl. per day in a low-pressure high-gas-oil-ratio well with a small liner up to perhaps 30,000 bbl. per day in a large high-pressure well with a low gas-oil ratio.

The flow meter has been satisfactorily pressure tested to 4,000 psi. and has operated at temperatures up to 180° F. It is believed, however, that there is no practical limit for temperature, say up to at least 300° F., and that with regard to pressure, the 4,000 psi. may be considerably exceeded.

Operational Experience

The first trial run in a prolific limestone well was marred by the presence of junk, and in consequence, the instrument jammed in the tubing, remaining in the hole 2 days before it was successfully pulled. During this time it was subject to a pressure of about 2,000 psi., but no damage resulted and no leaks were noted. A number of runs were then made in a shallow well under various conditions. It became apparent that to insure best results in a survey, the instrument must be kept as clean as possible and be carefully overhauled before each run. It was found to be preferable to run surveys in a downward direction to avoid, until the last, fouling by any mud, etc., in the lower nonproductive sections.

The results of two test surveys are shown on Fig. 1. This well is completed with a prefabricated liner and was producing 370 bbl. per day with a gas-oil ratio of 1,100 cu. ft. per bbl. from sands and thin limestone beds. The correlation between the indicated speeds, the position of the main sand, and the changes in casing size is reasonably good. The reproducibility of the readings is also satisfactory. Excluding the points where zero flow is recorded—where the flow rate is below the minimum sensitivity of the instrument—the mean divergence of individual readings of flow speeds from the averages at the same depths is about 7 per cent.

Due to the extreme lightness of the gas-oil mixture (0.06 g. per cc.) the flow meter calibration which was made with water indicates about one-third of the true speed at the top of the liner.

The results of surveys in two limestone wells, one producing 1,730 bbl. per day and the other 8,120 bbl. per day show a mean divergence between individual readings of flow speeds and the averages of about 2 per cent.

Although the relation between the absolute accuracy of the instrument and the flow conditions, speed, density, and so on is not yet known, it is clear that the reproducibility of

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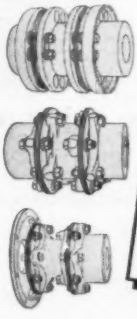

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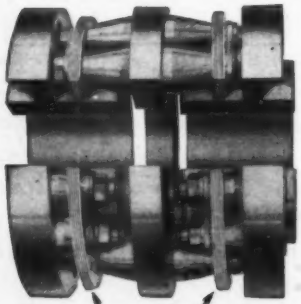

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readings under steady conditions is good.

Maintenance of the instrument has been very straightforward for the instrument repair shop. The original type of centralizers are the weakest item: those provided are wearing out in 40,000-50,000 ft. of run and may be considered expendable. However, tests are being made with neoprene-coated centralizer springs, as used in the Totco deviation instrument, in order to obviate this difficulty. The only other changes have been two permopoints on the impeller shaft, and the lower jewel bearing, which were replaced after 50,000 ft. of run, or seven surveys, although they were still strictly usable.

Time Schedule

One of the advantages of this instrument is the ease and cheapness with which surveys may be made. A typical time schedule for a 7,000-ft., high-pressure well, is as follows:

	Minutes
Rigging up lubricator, and running instrument to tubing shoe	50
Surveying 500-ft. hole at 50-ft. intervals	90
Pulling out by motor, and rigging down	50
Total	190

In addition, a flowing pressure survey may be desirable, this would add about 1½ hours.

Certain modifications have been suggested to extend the use of this basically simple instrument to smaller producers, and to water or gas-injection wells. These are:

1. **Extension of use to low velocities.**—To improve the sensitivity of the instrument it is essentially necessary only to fit an expanding skirt to the bottom of the flow meter to direct a greater part of the production against the impeller vanes, and provide a streamlining grid to reduce the degree of turbulence. A clock timing unit would be needed.

2. **Use in injection wells and thief zone analysis.**—A small rearrangement of the system of housing, together with the clock and packer system as mentioned, will permit a measurement of downward velocities. A probable minimum rate for the operation of the instrument with water is estimated to be 50 bbl. per day.

3. **Reduction of over-all diameter.**—It is understood that there is no basic reason to prevent the over-all diameter of the instrument being reduced to 1¼ in. and so permit it to pass easily through any normal tubing. Actually, provided the greater part of a well's production can be made to pass through the flow meter, the smaller its over-all diameter, the better should be its sensitivity.

Conclusions

It is already clear that this impeller type of flow meter offers sufficient promise to be strongly recommended for more general use in future. The pros and cons of the instrument may be summarized as follows:

1. It is of simple construction, direct reading, relatively inexpensive, and easy to maintain.

2. It can be run through tubing on an ordinary wire line, and surveys can be carried out by a regular pressure-bomb crew.

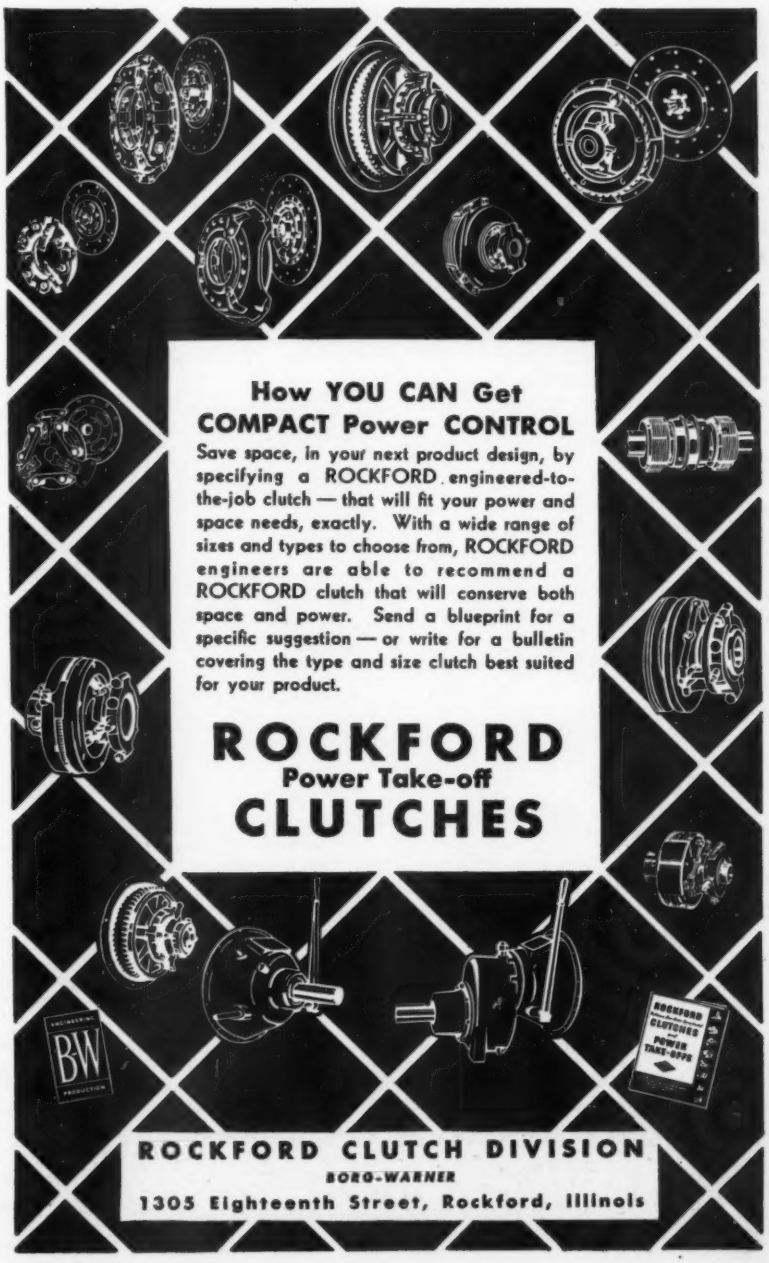
3. It is reasonably robust and can probably be run successfully in wells making appreciable quantities of b.s. and w., though the sensitivity and accuracy might be impaired.

4. Provided the tubing is already set above the interval to be surveyed, it is not necessary to kill the well or otherwise affect its productivity, and there is normally no production lost.

5. With an instrument modified to be of suitable range the results are accurate within a few per cent.

6. Even under Venezuelan conditions, surveys are relatively cheap.

7. The sensitivity of the present instrument is suitable for the purpose for which it was designed. It is, however, practicable to modify it to give greater sensitivity and make it suitable for the majority of flowing oil, gas or water wells, straight gas-lift wells, and also for injection wells. The possible extreme range for oil wells appears to be from a maximum of 30,000 bbl. per day down to a minimum of 30 bbl. per day.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Automatic Lubricators in Flow-Meter Service

Improved types reduce freezing, dragging, and leakage in orifice meters with bearing shafts

by Roy F. Carlson
Dallas District Editor

MANY recording orifice meters today are giving highly accurate service over prolonged periods of time with minimum maintenance costs. This service is being rendered even in cases of extremely high line pressures, where a high concentration of hydrates is present in the measured gas, and where the gas or fluid being measured is highly corrosive. In flow meters employing a lubricated-type bearing shaft, this performance can be further assured by improved lubricators which effect continuous automatic sealing and lubrication of that vital meter mechanism.

In those orifice meters which use the bearing shaft, to transmit changes in pressure from the meter pressure chamber to the recording mechanism, the bearings are finely engineered and operate with extremely close tolerances. Some bearings are ground so close that a perfect metal-to-metal seal is accomplished; extreme freedom of movement is allowed at pressures of several hundred pounds without lubrication. To assure maximum sensitivity between the float in the meter pressure chamber and the pen arm of the recorder at all times, however, it is necessary that a lubricant be used.

New Automatic Lubricator

At some Texas and Mid-Continent field and plant metering installations this lubrication is being provided by a new type "excess pressure" automatic lubricator. In this type lubricator the lubricant is maintained under a pressure slightly in excess of that on the measured product, regardless of whether the line pressure is a few hundred or several thousand pounds. By so doing the following conditions are secured:

(1) Vapor locking and freezing of bearing shaft due to high-pressure gas entering and contacting with bearing surface is eliminated. (2) Contamination and deterioration of the lubricant by highly volatile liquids, or gas, is prevented. (3) Corrosion and permanent damaging of bearing shaft and parts are eliminated since they are isolated from the fluid or gas. Since a relatively light-weight lubricant is used, the working parts of the bearing shaft are more or less "floated" within the housing.

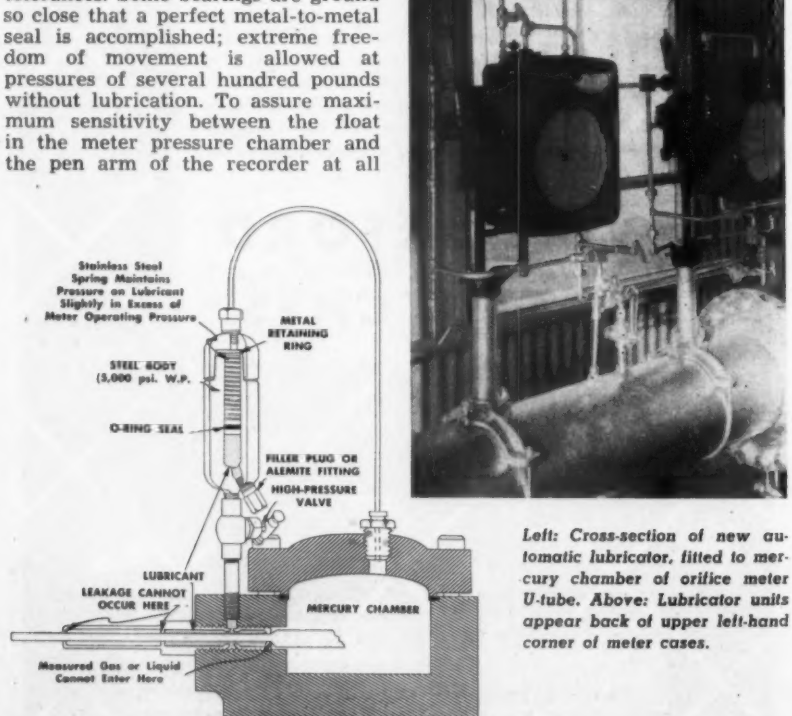
In most early automatic lubricators the operating principle was based almost entirely on the theory of maintaining a greater supply of lubricant than the manually operated ones with which meters are generally equipped. The pressure drop across the orifice plate was utilized as the sealing force; a continuous flow of fluid or gas was necessary as the lubricator could not function unless there was a pressure drop across the plate. If static pressure remained on the line for any length of time, the fluid or gas being metered would enter the bearing housing and often result in malfunction of the meter. These early lubricators also were limited to flow meters with differential mechanisms constructed in the downstream mercury chamber.

A much greater supply of lubricant was contained in these differential-feed type lubricators than in those manually operated, but the time of effective lubrication was comparatively minimized due to rapid absorption of the hydrocarbons in the measured fluid (or gas) by the sealing medium. This action was ever present due to both fluid and lubricant being in contact with each other at identical pressures.

Where line pressure alone is used to accomplish continuous automatic lubrication, a fully packed bearing housing will prevent the gas from entering the housing for a time. Just how long this period is depends upon the line pressure, type of grease used, and the penetrating qualities of the measured products.

If light greases are used, and these generally are the best sealing mediums because of their high oil content, the lubricant may be diluted quickly into a thin emulsion and forced from the housing. Extremely hard, soap-base lubricants usually forestall leakage longer than light greases, but they do not permit the shaft to move as freely in recording the pressure changes. Also they eventually harden, because of their low oil content, resulting in excessive removal of bearings and increased maintenance costs.

Dissolving, and/or contamination, of the lubricant generally begins at the rear end of the bearing-shaft housing. The action then progresses along the shaft until eventually the gas or fluid breaks through at the front end of the housing. The shaft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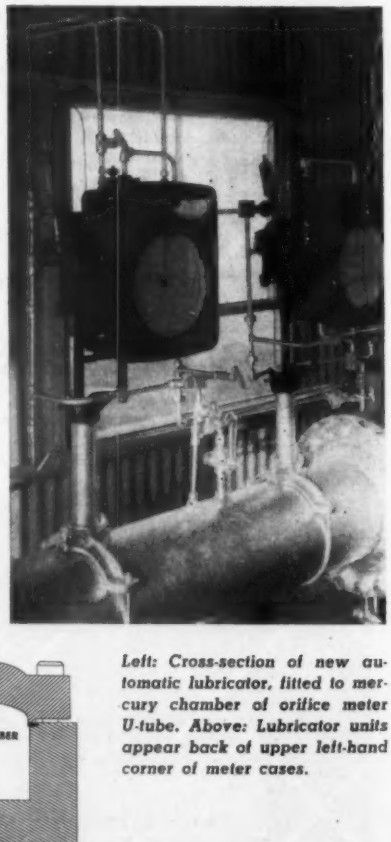

Left: Cross-section of new automatic lubricator, fitted to mercury chamber of orifice meter U-tube. Above: Lubricator units appear back of upper left-hand corner of meter cases.

then is exposed to attack by corrosion, hydrate formation may cause the shaft to freeze or lock, or accuracy of the recordings may be lessened because the shaft cannot freely move.

When lubricators of the excess-pressure type are used, pressure on the lubricant in the shaft housing is always slightly above line pressure. This is accomplished through use of a light coil spring and piston housed in the lubricator. The light grease being under higher pressure than the measured product, contamination and dissolution by the line product is practically prohibited. Thus, because the bearing-shaft grease supply remains fully packed and protected against contamination, use of heavy-type lubricants with their inherent disadvantages is no longer necessary.

These lubricators are connected, through use of stainless-steel tubing and connections, into the same side of the meter as that from which the bearing shaft originates (see accompanying diagram). This eliminates the possibility of pressure equalization upon the meter, and erroneous recordings, in the event the lubricator becomes emptied. Likewise it prevents malfunction of the lubricator if hydrate formation causes the manifold valves to freeze.

Field experience has shown that the lubricators require filling only once a year on an average. Some flow meters operating at pressures above 4,500 psi. have been in service and operating perfectly for 18 months without attention to bearing lubrication. In addition to this lessened servicing cost, the expense of having to replace the relatively expensive bearing-shaft assembly occasionally was entirely eliminated. Reductions in meter maintenance costs as high as 60 per cent were realized in several cases.

The lubricators shown in the accompanying photograph and diagram are designed for working pressures up to 5,000 psi. Another model, for use on pressures up to 750 psi., is especially designed for use on wet-gas purchase meters. Either is adaptable to all makes of meters, regulators, and other pressure equipment using lubricated-type stuffing boxes.

BOOKS

OIL BURNERS. By Kalman Steiner. Published by McGraw-Hill Book Co., 330 West 42nd Street, New York 18. 502 pp. $6.50.

This is the completely rewritten second edition of a manual designed to bring the reader an up-to-date treatise on fuel oil, oil burners, and oil burning. It describes in detail what the designer, installer, service man, and user needs to know about the design, production, installation, operation, and maintenance of domestic, commercial, and industrial oil burners. It covers both underlying theory and engineering, as well as actual practice, and answers questions on what is significant in oil-burner practice. Such subjects are covered as electronic control methods, refractories, capacity of boilers and warm-air furnaces, draft and combustion control, and so on.

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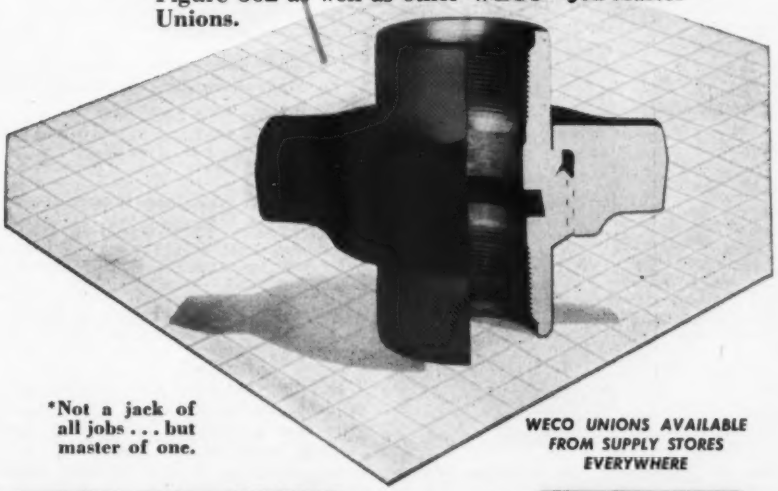

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PROGRESS in METALS

by W. L. Nelson
Consulting Engineer

Ductile Iron—Century's Greatest Advancement in Art of Cast Iron Manufacture

IN May 1948, International Nickel Co. announced its research work on the spheroidizing of graphite in cast iron by the use of magnesium. The new material is covered by U. S. Patents 2485760 and 2485761.

The graphite in regular gray cast iron is in the form of flakes which may not connect throughout the material but nevertheless impart brittleness and behave as a multitude of notches and discontinuities in the metallic matrix. In ductile or nodular cast iron, the graphite particles are isolated pockets and hence it exhibits properties more like those of malleable iron. In fact, the tensile strength is superior to that of malleable iron, and the elongation is 15 or 20 per cent. Ductile cast iron is produced by adding a small amount of a nickel-magnesium alloy. Part of the carbon may be left in the matrix (rather than in the nodules) and hence the material can be used in the pearlitic or in heat treated conditions which have higher strengths. Additional information is available in the following articles:

1. Nickel Steel Topics, International Nickel Co., New York, March 1949.

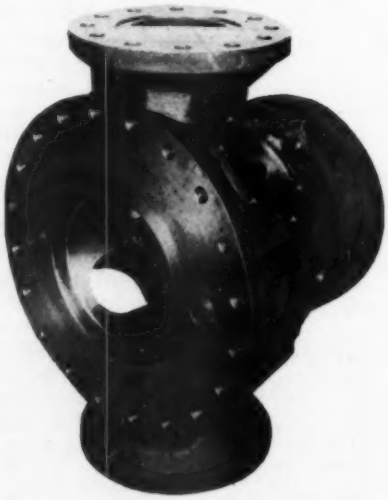


Fig. 3—Compressor head, cast in ductile iron by Cooper-Bessemer Corp., Mt. Vernon, Ohio.

Fig. 1—Indicative of the suitability of ductile iron for light-sectioned and intricate castings. (Parts produced by Sacks-Barlow Foundry Co., Irvington, N. J.).

2. Nodular Cast Iron, The Oil and Gas Journal, May 19, 1949, page 365.
3. C. K. Donoho, Am. Foundryman, February 1949.
4. Gagnebin, Millis and Pilling, Machine Design, March 1950.
5. Kuniansky, M., "Problems in Producing Ductile Cast Iron," The Iron Worker, published by Lynchburg Foundry Co., Lynchburg, Va.
6. "Ductile Iron . . . Advance in Cast Iron Field," Nickel Topics, November-December 1949, International Nickel Co., New York.

Ductile cast iron enjoys the same process advantages that have made gray iron a popular and widely used casting material for so many centuries, such as a low melting point, exceptional fluidity, and good machinability. Because of the flexibility and quality of its mechanical and physical properties, it has been said that this new engineering material closes the gap which existed previously between cast iron and cast steel.

Its potential applications are many and varied. The automotive, farm-implement, oil, railroad, and many other industries can apply it in component parts too numerous to list in detail. Applications for which the new metal appears to be especially well adapted include the following:

1. Castings requiring mechanical properties better than those of gray iron and yet which are too intricate in shape to be cast in steel.

2. Pipe products requiring good strength, toughness, and pressure-tightness. The fluidity and good casting properties of ductile iron make it ideal for this and other pressure castings.

3. Castings demanding better impact resistance than ordinary cast iron because of exposure to shock loads in regular service. Many parts of farm equipment and road-building and construction machinery are in this category.

4. Paper-mill dryer rolls require good rigidity to minimize deflection resulting from their weight and working loads, to provide a uniform gage across the width of the paper. A flawlessly smooth surface is also essential. Ductile iron solves these problems by reason of its high modulus of elasticity (25,000,000 psi.), its good casting qualities, and machinability.

5. By casting appropriate compositions of ductile iron against a chill, it is possible to obtain a carbidic abrasion-resistant surface with a body or interior of good ductility. This quality has been taken advantage of in plow shares, of which 10,000 have been produced to date by one manufacturer; and in spite of being used in rocky soil during an abnormally dry season, less than two dozen have failed.

Several of the applications are indicated by Figs. 1, 2, and 3 which were furnished by International Nickel Co.

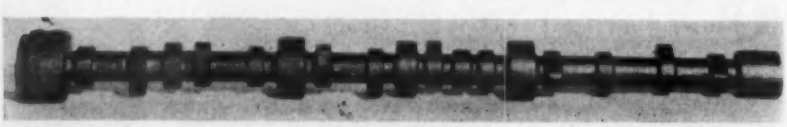


Fig. 2—Automobile camshaft, produced by Lynchburg Foundry Co., Lynchburg, Va., in ductile cast iron.

Forging Terms or Operations

COINING

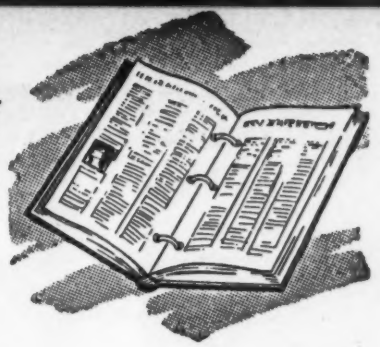
Forming, to close tolerances, of a part of a metal surface by applying pressure over a small area. It is often a finishing operation in drop forging or other processes. Frequently it is a **cold** rather than a **hot working** operation. Coining presses or sizing presses are employed.

EDGING

Forming the ends of bar or similar stock usually with the aid of dies by use of a trip hammer or helve hammer. **Fullering** applies to the shaping of such stocks between the ends, whereas **swaging** is a surface working operation for such stocks.

The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL



Control-Valve Characteristics

AS noted in the preceding installment of The Refiner's Notebook, valve positioners are sometimes used, acting as a relay to multiply available power for precise positioning of the inner valve. Use of positioners is indicated (1) where packing is tight, there is tendency for the valve to stick, or lubricant does not function; (2) under conditions of high pressure and with single-seated valves in larger sizes; (3) with proportional-plus-reset controllers; (4) to obtain rapid response in remote control applications, and (5) with wide (10 per cent or greater) proportional band. Valve positioners usually should not be used (1) with narrow (10 per cent or smaller) proportional band, (2) for on-off control, or (3) for automatic flow control unless such control is quite critical or operated with reset for rapid change.

Flow Characteristics

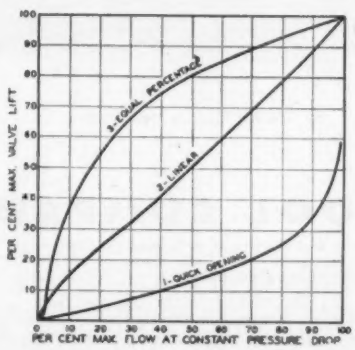
While some inner valve constructions were shown previously, no attempt was made to compare control valves on the basis of construction. Comparison is best made in terms of flow characteristics. Essentially, the diaphragm control valve should function so that (1) the inner valve is placed in a definite position corresponding to a given pressure on the diaphragm, (2) the change in movement of the inner valve is proportional to change in pressure on the diaphragm, and (3) the desired flow for control purposes is obtained corresponding to each position of the inner valve.

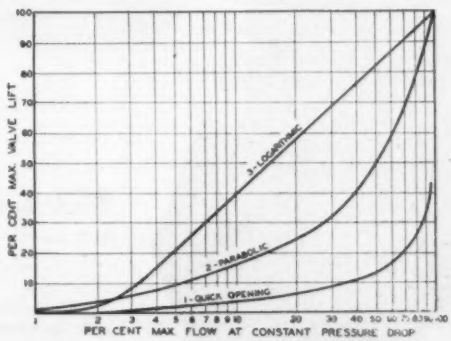
Quick-opening valves.—Flow characteristics of control valves may be represented by plotting the flow through a given valve in gallons per minute or per hour against the valve opening (valve-stem travel, position, or lift). More commonly, however, the plot is made as in Figs. 1 and 2 in terms of per cent of total or maximum flow (flow at full opening) versus the per cent of full opening or per cent of maximum lift. Plotted in this manner on rectangular coordinates (Fig. 1), the curve (1) indicates, in general, the flow characteristics of a quick-opening type valve with low lift such as a beveled disk. A valve of this type is used mainly for on-off applications with direct-operated (self-acting) controllers.

Characterized valves.—Curves (2) and (3) represent the flow characteristics of "gradual opening" or "characterized" type valves with high lift and inner valves shaped to produce essentially linear or parabolic flow characteristics. These valves are used with more complex controller systems for proportional or proportional-plus-reset modes of control where close throttling is required or flow varies considerably. Plotted on semilog coordinates the linear characteristic of curve (2) is termed "parabolic" while the equal percentage curve (3) is termed "logarithmic." Linear (parabolic) characteristics may be obtained with V-port skirted inner valves or parabolic-shaped solid plugs (also known as throttle plugs) and in smaller sizes with piston, cone, spline or needle plugs. Equal percentage (logarithmic) characteristics may be exhibited by certain V-port constructions (sometimes termed percentage V-port) or solid turned plugs called percentage parabolic or ratio plugs.

Note that in general the linear characteristics curve (2) represents a quicker-opening valve than the equal-percentage curve (3). For the linear characteristic flow is in direct proportion to lift. Thus if valve lift is increased from 50 to 60 per cent of maximum, flow increases from 50 to 60 per cent of maximum. An increase in valve lift from 60 to 70 per cent increases the flow from 60 to 70 per cent, etc. This is not true of the equal-percentage characteristic. Here the change in flow per unit change in valve lift or stem travel keeps increasing over the range from closed to fully open. "The change (in flow) is proportional to the quantity flowing." At a high per cent of maximum flow a unit change in valve position produces a larger increase in flow than that produced by the same (equal) unit change in valve lift at a low per cent of maximum flow.

Rangeability.—Note that curve (3) is straight line in Fig. 2 over the range from 100 per cent down to about 2 per cent of maximum flow. This is due to the fact that positive shutoff is not obtainable. Thus the valve whose flow characteristic is plotted as curve (3) has a rangeability of 50 which is typical of high lift valves. Rangeability is defined as the ratio of the maximum to the minimum percentage of total flow controllable with a given valve. As a rule skirted valves will control down to 1 or 2 per cent of maximum flow while shaped plugs are available controlling to 3 or 4 per cent of their maximum flow. Rangeability is important where there is wide variation in flow requirements.





Quick opening, linear (parabolic) and equal-percentage (logarithmitic) control valve characteristics at constant pressure drop as plotted on rectangular coordinates, Fig. 1 (left), and on semilog coordinates, Fig. 2 (right).

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Histograms of Permeability

IT has been noted that the histogram is one method of expressing the variation of a rock property such as permeability. It is well to examine some of the properties of this type presentation and to show typical cases.

The interval chosen to represent the variable on the x axis can be made as large or as small a step as desired. It is obvious that if the interval is too small then the number of samples within an interval might be zero or some small integer and the resulting graph would have a series of ups and downs. On the other hand if the intervals are made too large then no variation can be noted.

Fig. 1 shows a histogram of permeability drawn by choosing two different intervals. The data are from Reference 1. In the lower of the two graphs the interval is 10 md. In the upper it is 20 md. Although the upper graph cannot be said to be a truly "normal" curve it more nearly represents the distribution than does the lower graph. The same remarks can be made for the lower two histograms in Fig. 2, the data for which are from Reference 2.

It appears to be typical of a good many histograms of permeability that they have the shape similar to that of the upper graphs in Figs. 1 and 2. Continuous distribution curves drawn through these would be asymmetrical with the slope on the left being steeper than on the right. Law[3] has suggested that distributions of this nature might be made to look normal by using a logarithmic interval on the x axis. For example, the intervals might be from 0.1 to 1 md., from 1 to 10 md., from 10 to 100 md., and so on. One need not, however, use a base of 10 for the logarithmic interval. Law found in the permeability analyses examined by him that $(2)^{1/2}$ was the most desirable base for the logarithm scale. The intervals he used were, therefore, from 1.25 to 2.5 md., from 2.5 to 5 md., from 5 to 10 md., from 10 to 20 md. and so on.

Using a logarithmic interval spreads the histogram out on the left side and compresses it on the right side thus tending to make it symmetrical. Fig. 3 is a duplication of one of Law's histograms showing the normal curve which he fitted to this histogram. On the x axis are given both the permeability intervals and the logarithm intervals. The logarithm intervals are numbered using K/10 as that point for which the logarithm is zero. This point is chosen merely for convenience, because it is easier to divide the permeability values by 10 than by some other number.

The asymmetry might also be an evidence of the existence of more than one type of permeable system. Should the samples be taken from a portion of the bed in which no silts or clays occurred, then the most probable permeability in this portion would be represented by that value determined by the grain size, pore arrangements, etc. Should the sample be taken from a different portion where a large amount of silt or clay was present, then the most probable permeability would be considerably lower. By sampling both of these portions and grouping them together to attempt to show one distribution the result would have asymmetry. For example, the lower histogram of Fig. 2 might be said to be a composite of two systems, one having its most probable permeability in the interval 30-40 md. and the other having its most probable permeability in the region 0-10 md.

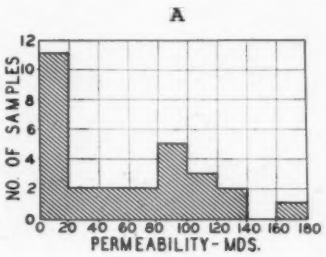
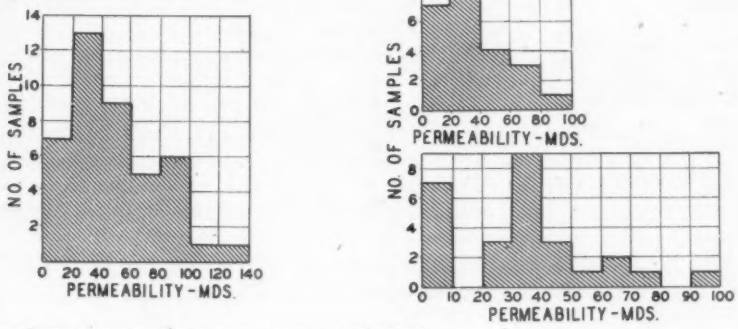
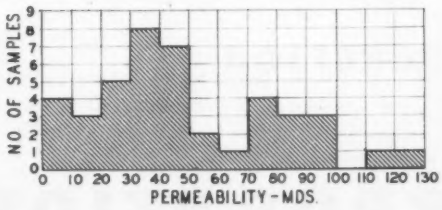


Fig. 1—(Below) Histograms of permeability using two different intervals. Total number of samples = 42.

Fig. 2—(Right) Histograms of permeability. Total number of samples in A = 28, B = 27.





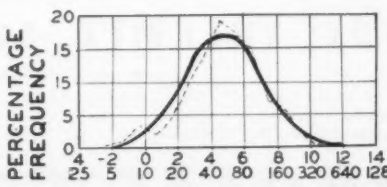


Fig. 3 — Dotted lines connect midpoints of histogram. Solid line is normal curve fitted to histogram points.[3]

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1. R.I. 4019, U.S.B.M., p. 30.
2. Secondary Recovery of Oil in United States, A.P.I., p. 186, upper and lower cored sections.
3. Law, a Statistical Approach to the Interstitial Heterogeneity of Sand Reservoirs, A.I.M.E., Trans. Vol. 155.

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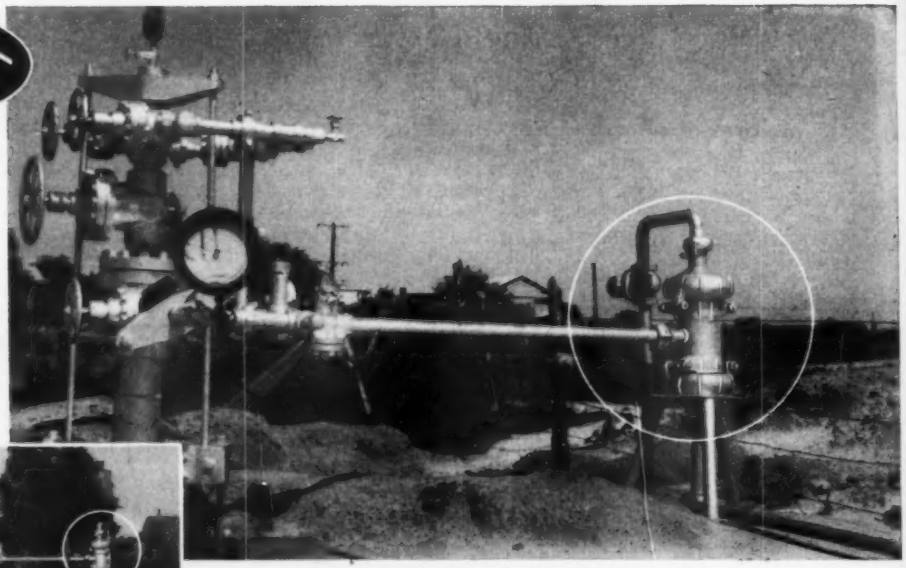

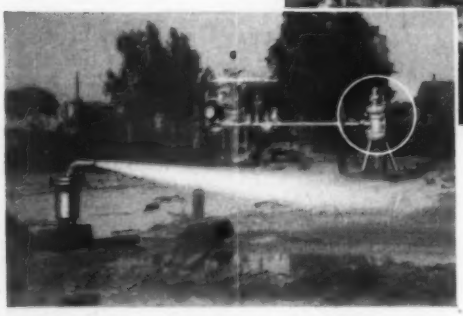

TOP: View of Aerotec Gas Scrubber at the well. The Aerotec unit, in circle, is simple, easy to install and highly efficient.

BOTTOM: Armstrong trap in foreground discharges liquid and solids every 3-4 minutes, from continuous discharge of Aerotec unit in background.

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15 STAINLESS STEEL WELDING FITTINGS PRICE LIST contains latest prices covering a variety of fittings such as elbows, return bends, stub ends, and tees, types 304, 316, and 347 stainless steel. *Cooper Alloy Foundry Co.*

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21 INTERNATIONAL POWER FOR PROFITABLE PIPE LAYING. Offers an interesting roundup of on-the-job action shots from spreads throughout the country, with owner and operator performance reports included in many of the photo captions. Diesel and gasoline, crawler and wheel models are shown in typical pipe-laying operations. *Industrial Power Division, International Harvester Co.*

22 FLOATING ROOFS FOR OIL STORAGE TANKS is a new 20-page booklet containing information on the reduction of evaporation loss and corrosion and the elimination of fire hazards in flat-bottom tanks storing volatile liquids and chemicals. *Chicago Bridge & Iron Co.*

23 U-BRAND QUALITY FITTINGS. A new descriptive folder illustrates and describes a representative group of malleable iron pipe fittings and cast-brass solder-joint fittings. *Union Malleable Manufacturing Co.*

FOR MORE INFORMATION . . . . use one of these cards

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
41 42 43 44 45 46 47 48 49 50

For further information—without obligation—I have checked numbered circles above

Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, May 11, 1950

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OIL AND GAS EQUIPMENT Digest

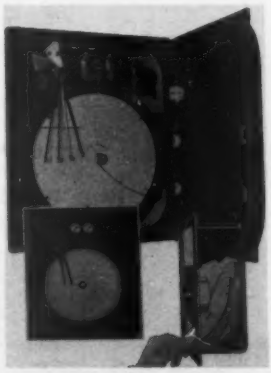
IT'S NEW CHECK IT

by Dan B. Miller

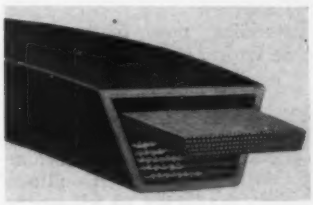
24 LITTLE GIANT STEAM TURBINE has been developed to stand up under the most rugged operating conditions, with little or no attention required through months of service. Only 26 in. long by 16 in. wide by 16 in. high, the Model TE-5 delivers 5 hp. at 2,000 to 3,600 r.p.m. Model TE-15 is rated 15 hp. at 3,600 r.p.m. These units, perfect for use in explosive atmospheres, are designed for powering shale shakers, pumps, fans, blowers, compressors, or similar apparatus. The construction is ideal for close-coupled units, and they may be mounted either vertically or horizontally. Among the special features of design are: grease sealed bearings; new type governor valve and control mechanism; fully enclosed weatherproof construction; special ventilation; and positive-type overspeed valve. *Moon Manufacturing Co.*

IT'S NEW CHECK IT

25 PRESSURE AND TEMPERATURE RECORDERS. Temperature measurement by the self-actuated tube systems of the gas-filled, vapor-tension, and liquid-filled types for ranges from —100° to —800° F. are offered. Bourdon springs used are unusually sturdy, thus increasing instrument life. Emphasis is also placed on accurate calibration and long aging of each element. New case design accommodates up to four pens. Storage space is provided within the case for 200 charts and 4 bottles of ink. Operators can perform the routine functions of chart changing and pen filling quickly and easily with no chance of applying the wrong chart. *Penn Industrial Instrument Corp.*

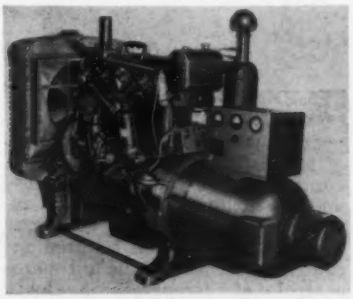


26 HY-T, a new line of superrated V-belts incorporates a chemically produced fiber of extremely high-strength, low stretch, and excellent shock-absorbing qualities. The new synthetic cord is also water and mildew resistant. The greater fiber enables this belt to handle 40 per cent more horsepower. Inherent resistance to shrinking is another advantage of the new fiber. This quality gives the belt greater length stability. The other materials which form the outside covering have been treated with a mildew-inhibiting agent, thus assuring maximum protection from malignant growth. *Goodyear Tire & Rubber Co.*



IT'S NEW CHECK IT

27 DIESEL-DRIVEN ELECTRIC-GENERATING PLANTS are equipped with automatic voltage regulators and range from 12½ to 55 kw. Powered by International Harvester low-speed engines, these new units are cranked by a 12-volt starting system similar to any conventional gasoline engine. Less than a minute of warmup is required before changing over to full diesel operation by means of a control lever. A battery-recharging generator is provided to maintain starting batteries at full charge. Available in all standard voltages, frequencies, and phases, these new diesel models assure low-cost electric power by operating on low-priced easily obtained fuel oil. *D. W. Onan & Sons, Inc.*



IT'S NEW CHECK IT

28 RECYCLING WELL-HEAD ASSEMBLY. The entire assembly consists of well casing, a casing head, tub-

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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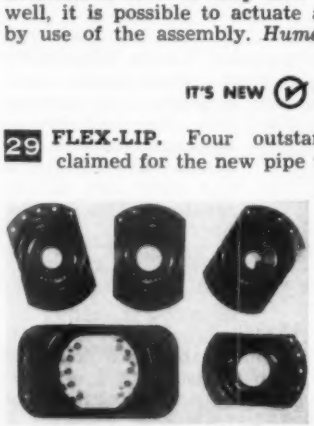
ing, casing string, and a separator. Gas is taken from the tubing through a separator from where it is pumped into the annulus between the tubing and the casing. If desired, the separator can be bypassed. Means are provided to reinject the gas into the tubing at a predetermined level to help flow the well. For a pumping well, it is possible to actuate a special downhole pump by use of the assembly. *Humason Associates, Inc.*

IT'S NEW CHECK IT

29 FLEX-LIP. Four outstanding new features are claimed for the new pipe wiper: economy, since one body size accommodates all pipe and rotary sizes and it is only necessary to replace the inserts; a floating accordion action which allows the wiper to follow the pipe on any off-center condition so that the wiper is always in contact with all parts of the pipe at all times; greater convenience of installation since the wiper can be installed or removed without pulling rotary bushings; and a balanced design which gives the body strength, stiffness, and durability and allows the inserts to be made of a fast snap-back, high-tensile material. *Petroleum Mechanical Development Co.*

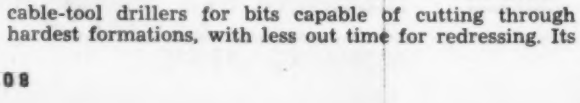


IT'S NEW CHECK IT

30 PNEUMATIC CURRENT CONTROLLER was developed primarily to permit the use of standard industrial pneumatic controllers on applications involving electrical components as the final controlled element. These assemblies can be used in control systems for the ultimate control of temperature, flow, speed, pH, etc. Among its uses would be temperature control on electrically heated stills and column in pilot plants and laboratories. It utilizes a standard electrical component modified for continuous throttling control service, and the pneumatic cylinder operator which includes an integrally mounted positioning device to provide accuracy and sensitivity of positioning to within 1/500 part of its total travel. *Conoflow Corp.*

IT'S NEW CHECK IT

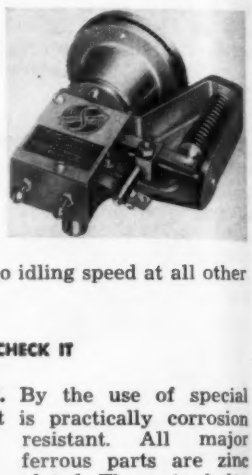
31 DRILMOR ALLOY BIT. As its name implies, this bit was developed to meet an everincreasing demand of



cable-tool drillers for bits capable of cutting through hardest formations, with less out time for redressing. Its extreme hardness makes this bit hold a cutting edge, wear longer, and resist battering, even in toughest going. *Acme Fishing Tool Co.*

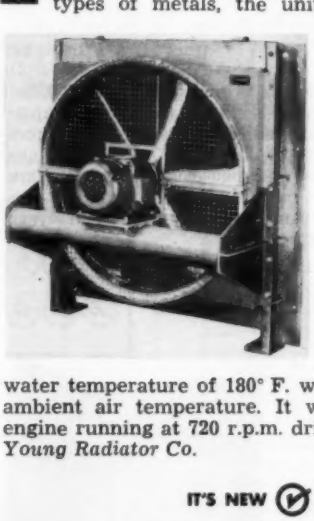
IT'S NEW CHECK IT

32 AUTOMATIC ENGINE CONTROLLER for engine-driven pumps on tank trucks saves time, gasoline, takes fewer steps, and reduces engine wear. It is pressure activated. It employs a diaphragm which moves in response to varying pressures on the outlet side of the transfer pump. This diaphragm movement is linked to the carburetor throttle rod to give the desired engine speed. With the automatic engine controller, the engine operates at pumping speed only when pumping and drops to idling speed at all other times. *A. O. Smith Corp.*



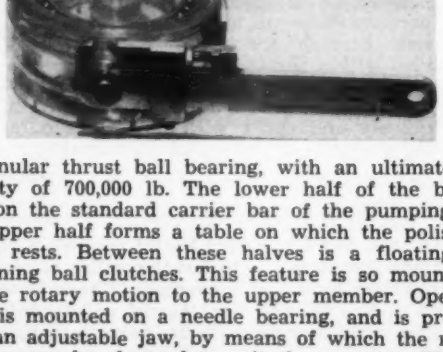
IT'S NEW CHECK IT

33 MONOWELD RADIATOR. By the use of special types of metals, the unit is practically corrosion resistant. All major ferrous parts are zinc plated. The nuts, bolts, screws, and washers are cadmium plated. The natural corrosion resistance of copper, brass, and aluminum protect the actual core and cooling parts of the unit. A priming coat of zinc chromate is applied, which in turn is followed by a coat of gray enamel. The radiator is designed to maintain a maximum jacket water temperature of 180° F. with a maximum of 120° F. ambient air temperature. It will cool a 173-hp. diesel engine running at 720 r.p.m. driving a 100-kw. generator. *Young Radiator Co.*



IT'S NEW CHECK IT

34 WILLIS ROD ROTOR illustration shows a lucite model of the new tool. Construction is essentially

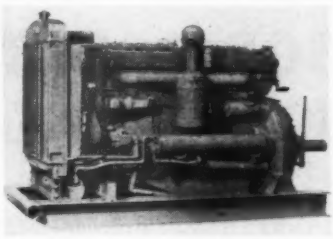


an annular thrust ball bearing, with an ultimate load capacity of 700,000 lb. The lower half of the bearing rests on the standard carrier bar of the pumping unit. The upper half forms a table on which the polish rod clamp rests. Between these halves is a floating ring containing ball clutches. This feature is so mounted as to give rotary motion to the upper member. Operating lever is mounted on a needle bearing, and is provided with an adjustable jaw, by means of which the rate of rotation can be changed to suit the operator. The tool was designed to reduce maintenance costs in pumping wells by preventing grooving of the polished rod by the

stuffing box, distributing wear evenly on the sucker rods and the rod boxes and on the pump barrel and plunger, preventing the rods from backing out of the rod boxes, and to operate paraffin scrapers. *Willis Oil Tool Co.*

IT'S NEW CHECK IT

35 DIESEL ENGINE. Refinements in design provide more power, greater economy, greater dependability, and longer life. Number of models has been increased. Five four-cylinder models and six six-cylinder models ranging in output from 90 to 200 hp. are now available. True diesel operation, plain open combustion chamber, four valves per cylinder, and hydraulic servo-type governor remain as the basis of the design of the engines, the additional power output resulting from improvements in the application of these principles. *Murphy Diesel Co.*



IT'S NEW CHECK IT

36 YOLOY CONTINUOUS WELD PIPE has these outstanding characteristics: easy to weld, bends and fabricates readily, tensile strength is high, is resistant to abrasion, resistance to shock and vibration is high, and is high in corrosion resistance. Yoloy has an atmospheric corrosion resistance from four to six times that of regular carbon steels. Its resistance to many other corrosive elements likewise is high. It is a nickel-copper low-alloy steel. *Youngstown Sheet & Tube Co.*

IT'S NEW CHECK IT

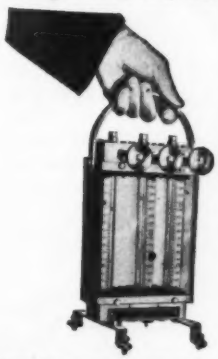
37 GAS MASK FOR HYDROGEN SULFIDE AND PETROLEUM VAPORS. A new high-efficiency gas mask, effective against hydrogen sulfide and petroleum vapors, consists essentially of face-piece, corrugated breathing tube, canister, and new back harness. A special feature is its oversize canister filled with premium absorbent chemicals that give extra long service life. This improved canister furnished protection for a period twice as long as that required for U. S. Bureau of Mines approval. The special back canister harness, with a shoulder hook to hold the corrugated breathing tube, permits more freedom of movement for the wearer. This is especially desirable in tank gaging or similar bending and stooping work. The mask will be especially useful to tank gagers, pumphouse men, pipe-line inspectors, repairmen, and others subject to hydrogen sulfide gas emanating from sour crude oil and raw distillates. *Willson Products, Inc.*

IT'S NEW CHECK IT

38 MAXISERVICE PLAN. A service plan that will enable industry to cut costs, perform research and control product quality, without investing in X-ray equipment offers package X-ray service, complete with equipment, maintenance, repair parts, tubes and instruction, all covered by one monthly charge. The monthly payment is 100 per cent chargeable against operating expenses. It eliminates the problem of depreciation entirely. It eliminates the obsolescence risks, since new equipment is available with no investment. *General Electric X-Ray Corp.*

IT'S NEW CHECK IT

39 TRIPLE METER RESEARCH KIT is a compact, portable kit, with a wide flow range for research, pilot plant, and field work. The kit has three integral metering tubes with two special floats for each tube made of pyrex and tantalum. The flow range of this meter is 0.1 cc. per minute to 0.5 g.p.m. of liquid and 5 cc. per minute to 2 cu. ft. per minute of air. The unit can be equipped with brass or Type 316 stainless steel builtin needle control valve. It is stocked in end fittings of steel, brass, aluminum, 303 and 316 stainless steel, hard rubber, nickel, monel, durimet, and Hastelloy "C." Total weight of the unit including self-supporting legs and carrying handle is 15 lb. *Brooks Rotameter Co.*



IT'S NEW CHECK IT

40 SIX-INCH HEAVY-DUTY QUICK COUPLING is designed to meet rigid requirements of heavy industry for a large coupling that is fast connecting and fast feeding, is light in weight with compact proportions, and is easily operated without tools. Dimension between flanges is 7 in. and weight is 17½ lb. The coupling is rated at 150 psi. A 40° turn is required to make or break the coupling. Locking is effected with ⅝-in. stainless-steel balls. Sealing surfaces are well protected and not easily damaged. Working parts of the coupling are completely sealed to prevent entrance of dirt or other foreign matter. Coupling body is of simple, rugged construction and is provided with a standard 6-in. commercial pipe flange. Mating nipple is available with either flanged or threaded end. *Roylyn, Inc.*

IT'S NEW CHECK IT

41 VERSI-PAK, a new, nonjacketed plastic packing will give long service, increase operating efficiency, and maintain an effective seal. It is available in two formulas: black, graphited, and white, nongraphited. Versi-pak has great density and is resilient. As a result it conforms readily to the shape of the stuffing box. It is recommended for use where temperatures do not exceed 350° F., and for pressures up to 600 psi. where "bull" rings or close-clearance glands are provided. It is available in sizes from ⅛ to 1 in. and in increments of ⅛ in. in spirals and butt-cut rings. *Raybestos-Manhattan, Inc.*

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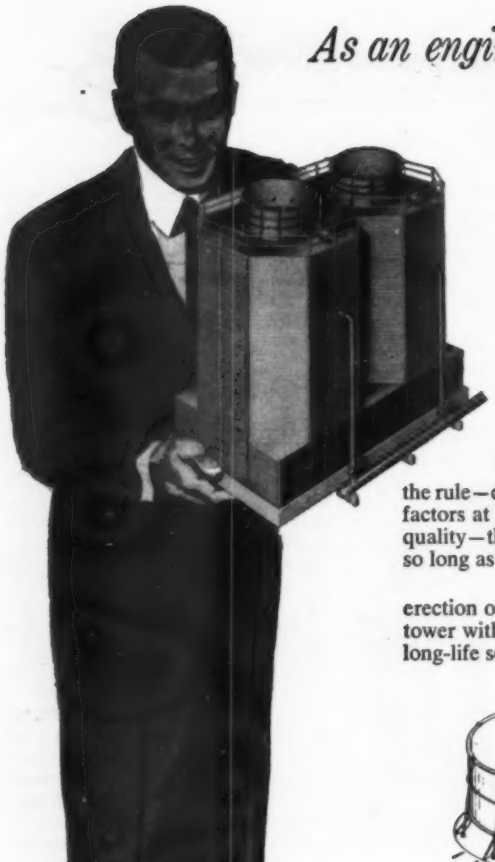
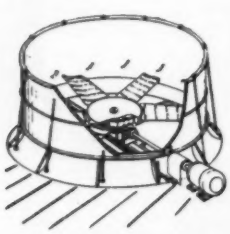
As an engineer you will appreciate...

The RUGGED DESIGN inherent in the 1950 FLUOR COUNTERFLO Cooling Tower



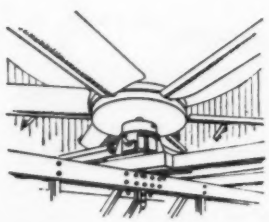
Ruggedness is a prerequisite in cooling tower design and performance. Without it, inefficiency and costly maintenance becomes the rule—drop in plant production is the end result. Regardless of the influencing factors at time of purchase—low first cost, claims of efficiency or statement of quality—the cooling tower you select will meet performance requirements *only* so long as its original structural design endures.

Thirty years' intensive development in the design, fabrication and erection of cooling towers enables Fluor to offer you a better cooling tower—a tower with comparable first cost, the highest obtainable efficiency and rugged, long-life service.



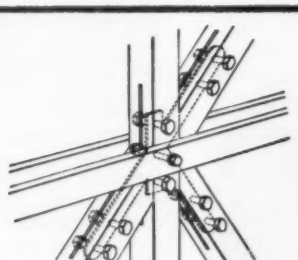
2" REDWOOD IN FAN DECK and STACK

2" redwood supports 1000#/sq. ft. load *anywhere* on deck—heavy enough to stiffen entire structure. Stack is ringed top and bottom with heavy angle iron and mounted on a metal bell-mouthed orifice—for safety and savings in power.



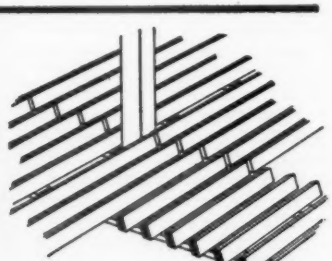
RUGGED GEAR UNIT and FAN BLADES

Gear unit is designed *specifically* for cooling tower service. Result: Less than ¼ of 1% replacement parts!
Heavy Stainless Steel Fan Blades give a larger moment of inertia—tips are strong enough to hold a man's weight.



STRONGER STRUCTURAL DESIGN

Internal gusset plate and bolt-type joints enable structural members to take *both* tension and compression loads—a design *in accordance* with the rigid requirements of major city codes and recent findings of the U. S. Forest Products Laboratory.



1" REDWOOD GRID DECK FILLING

Grid decks consist of heavy 1" redwood nailed individually on sturdy cleats—strong enough for use as scaffolding during tower erection, durable enough to permit repeated removal for cleaning or fire hosing without removing from tower.

CONSIDER THIS about

"Guaranteed Performance"

Fluor's "Guarantee of Performance" is based on a true bid to meet specified performance requirements. There is an old saying, "You can't get something for nothing." This is particularly true in the purchase of cooling towers—a bid allowing performance to be off only 2 or 3 degrees on the approach may seem insignificant at time of purchase, but it can mean as much as 30 to 40% difference in the size of tower necessary to do the specified job! Often this is overlooked if a tower is purchased on price alone.

For your protection compare the probable performance of the towers offered before making a decision. Analyze your cooling tower bids thoroughly!

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REFINING

New Oil Terminal

NEW YORK.—Completion of Pocahontas Calso's oil terminal in the former west yard of the New England Shipbuilding Corp. in South Portland, Me., is scheduled for September 15, according to E. H. Todd, newly elected president and director of the firm.

The new terminal, which will be one of the largest along the East Coast, is part of the physical properties of Pocahontas Terminal Corp., jointly owned by Pocahontas Fuel Co. and the California Oil Co. Contracts have been let for dredging, removal of certain buildings, and railroad repair, and work is now under way.

Fuel oil, gasoline, kerosine, and lubricants will be distributed from the terminal after being shipped from the Perth Amboy, N. J., plant of the California Refining Co. The latter company is currently engaged in a $32,000,000 expansion program which will bring the Perth Amboy daily refinery output of petroleum products up to approximately 50,000 bbl.

The terminal will be equipped to handle T-2 type of tankers, which have a carrying capacity of around 135,000 bbl., or 5,670,000 gal. Construction plans call for five 96,000-bbl. storage tanks and one 50,000-bbl. tank.

Navy Lets Contracts

WASHINGTON. — The Navy Department announced last week that additional contracts have been awarded for the purchase of 8,200,000 gal. of aviation gasoline and 1,650,000 gal. of JP-1 aviation fuel.

Union Oil Co. of California, Los Angeles, was awarded a contract for 4,200,000 gal. of 115/145 aviation gasoline at an over-all cost of $650,575, and Tide Water Associated Oil Co., San Francisco, will furnish 4,000,000 gal. of the same grade for $575,600.

The JP-1 purchase was divided between two compaanies, Sun Oil Co., Philadelphia, to furnish 850,000 gal. for $83,300 and Pontiac Refining Co., Corpus Christi, Tex., 800,000 gal. of $59,120.

Freight Rate Cuts Due

WASHINGTON.—The eastern railroads' lead in slashing long-haul freight charges for carrying lubricating oils and related products is expected to be followed by southern and midwest railroads, it was indicated here.

Eastern roads have notified the Interstate Commerce Commission that effective June 1 they will cut long-haul rates for lubricating oils to the prevailing maxima applied by the commission to gasoline, kerosine, and fuel oil. This amounts to decreases ranging from 15 to 18 per cent, according to estimates.

ICC in 1947 and 1948 granted the eastern railroads rate increases up to 25 and 30 per cent on petroleum products except gasoline, kerosine, and fuel oil. For those, ICC limited increases to 6 per cent, and later to 10 per cent.

What eastern railroads have done in line with general rate reductions to meet competition from other carriers is voluntarily bringing lubricating oils under the maxima set for gasoline, kerosine, and fuel oil for shipments in excess of 200 miles.

Strike Still On

OIL CITY, Pa.—Although 35 workers returned to work at the Emlenton, Pa., Quaker State Refining Co. plant last week, union officials stated that the strike is "far from over."

R. O. Aylor, Bradford, Pa., representative for Oil Workers International Union, and Paul Steffee, president of Independent Plant Local 455, asserted that there are five issues to be settled and the union is ready to meet with the management at any time. The strike has been in progress for more than 50 days.

The five issues, union officials said, are: seniority rights, 12.5 cents per hour increase, interplant inequities, union shop, and starting and termination date of a new contract.

Employes who crossed the picket lines to return to work, with the exception of two, were not union men, Steffee said.

Aylor said that the international union "is contemplating placing Quaker State on the unfair list." He said that "the union men will not go back to work under the conditions existing prior to the start of the strike."

New Building Opened

BATON ROUGE. — Formal open house has been held by Esso Standard Oil Co. at its refinery here for a new three-story office building to be occupied by Esso's petroleum technical service department.

The new building, which has 15,384 sq. ft. of floor space, has an automatic cooling and heating system. Besides providing space for 73 offices, the structure has a library, filing room, and conference room. It was built at a cost of about $280,000.

Arrangements for the open house were made by F. J. Geiser, N. C.

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Dunn, L. F. Thomas, and L. B. Watt, Jr.

Oil Depot Planned

PORT STANLEY, Ont.—Port Stanley Municipal Council had approved construction by Imperialle Fuels, Ltd., of London, of a fuel-oil storage and distribution depot to be built on land reclaimed from Lake Erie.

The plant, to be in partial operation before the end of the 1950 shipping season, will include four tanks of 35,000 bbl. each, with pipe line to the Main Street wharf.

Hydraulic-Brake Fluid

NEW YORK.—Sinclair Refining Co. has placed on the market a heavy-duty hydraulic-brake fluid, meeting all Society of Automotive Engineers specifications. It is designed to prevent possibility of corrosive action on metal parts of the brake system, and will not damage rubber cups or connections by swelling or contamination, the company said.

The high boiling point of the fluid offers protection against brake failure which may be caused by vapor-lock, and its extremely low cold test insures rapid brake action under all conditions, Sinclair reported. It mixes with all original equipment brake fluids and will not deteriorate or form sludge.

Multipurpose Grease

NEW YORK.—Shell Oil Co. announced last week that manufacture of its new multipurpose grease, Retinax "A," has been stepped up to meet the growing demand among automotive fleet owners. The company claims that use of its new product, for buses, trucks, and other heavy-duty equipment, brings about lower consumption of grease required for each job and insures quicker servicing of equipment.

Firm Gets Charter

AUSTIN. — Hal-Mac Refining Co., Inc., Tyler, Tex., has been granted a domestic corporation charter, according to the secretary of state. Capital stock of the company was placed at $10,000. Incorporators are D. H. Sudderth, R. W. McMahon, and Hal E. Felker.

Aruba Safety Award

ARUBA, N. W. I. — Lago Oil & Transport Co., Ltd.'s, refinery, shipyard, and stevedores-wharfingers each won first place in their respective divisions in the 1949 National Safety Council contest. Aruba's Esso Transportation Co. won third place in the tanker division. Lago led the companies in the accident frequency rate of 1.64 per 1,000,000 man-hours worked. The company taking second place had a rate of 1.85.

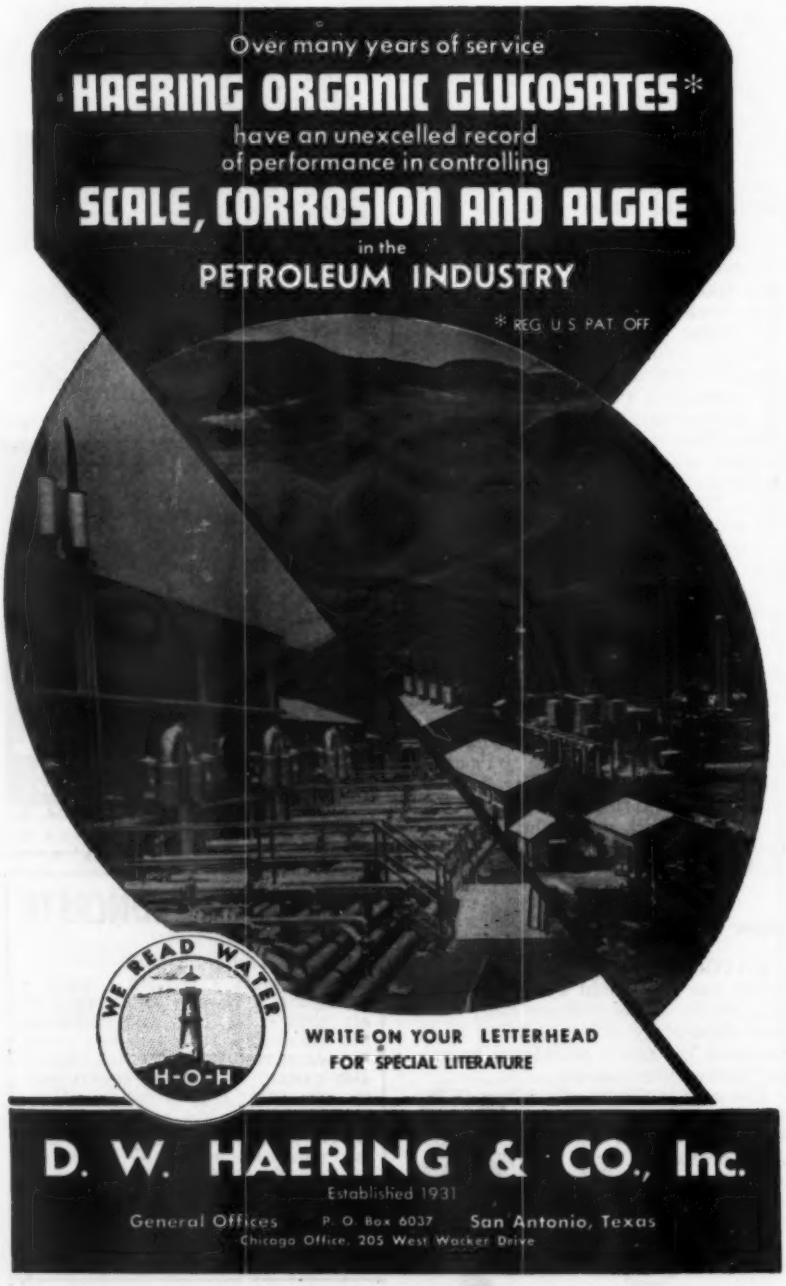
Oil Against Mosquitos

BATON ROUGE.—The city of Baton Rouge has found a new use for oil—to fight mosquitos.

The city has four Jeeps equipped with pumps, which will spray approximately 50 miles of ditches weekly, covering the entire city. The pumps, attached to the Jeep motors, includes suction and pressure hoses, and will spray a solution of diesel oil and D.D.T. under 50 to 75 lb. pressure. The diesel oil-D.D.T. compound, unlike other solutions, mixes with the water in ditches rather than floating on top.

Nylon Cover From Oil

A new all-nylon slip cover for automobile seats that can be removed within a few seconds, washed, and replaced without line drying or ironing, is one of the latest petroleum-derived products to come on the market.



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Flapper Type "Bull's Eye" Indicator
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F&P "Bull's Eyes" have double windows, flanged covers (no threads to corrode and seize) and through-bolted construction. They are suitable for normal and corrosive service and for low and high pressures. A ½" screwed cast iron "Bull's Eye" costs $10.00, as little as $8.00 in larger quantities.

At your request we'll mail catalog 93 (which illustrates the complete line) and a price list.

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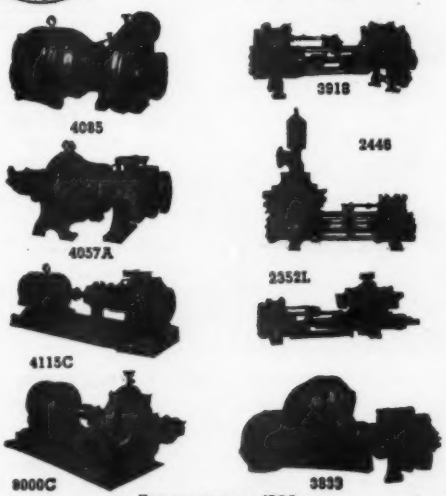

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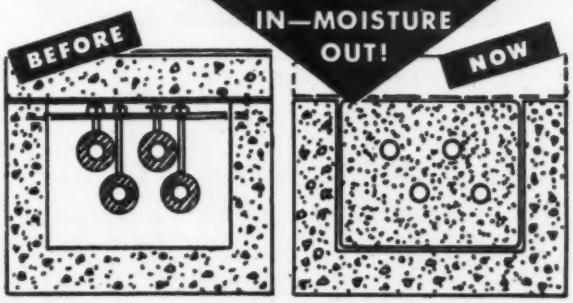

Open void permits water to attack insulation and increases the chance of heat loss due to convection.

No more voids where water can collect . . . "Z"-Crete solid construction reduces chance of convection losses.

Permanent as the Earth Itself

Here's a case history from a housing project in Norfolk, Virginia! Six years after the original, old-fashioned installation, a loss of efficiency was seriously hampering the hot water supply to the housing units. When opened up, the insulation was found to have deteriorated extensively, even disintegrated in spots. Corrosion had attacked metal parts and piping.

Reclaimed with a solid pour of Z-Crete insulation, this system is now a permanent, highly-efficient heating conduit.

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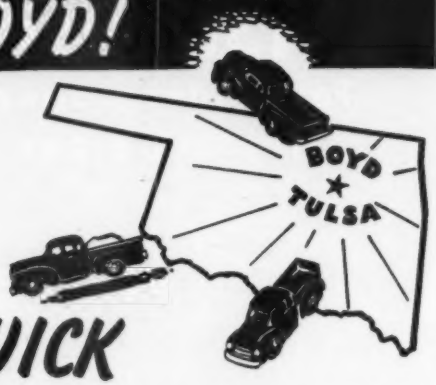

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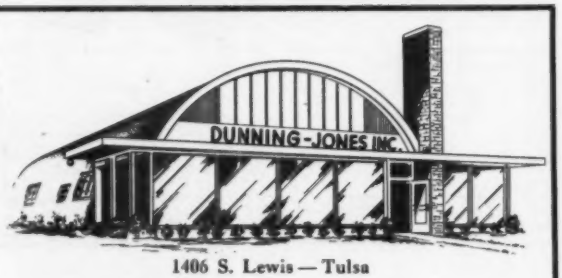

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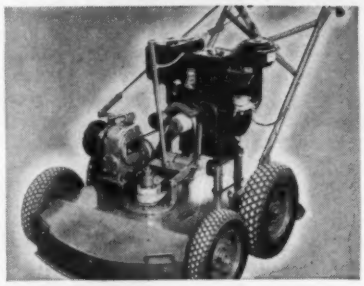

WHIRLWIND "SP"

. . . 24-inch self-propelled rotary-scythe mower grooms fine lawns . . . wades easily through tall weeds and tangled vegetation. 4 h.p. Briggs & Stratton engine. Welded, heavy plate steel construction. Equipped with 16 precision ball or roller bearing units.

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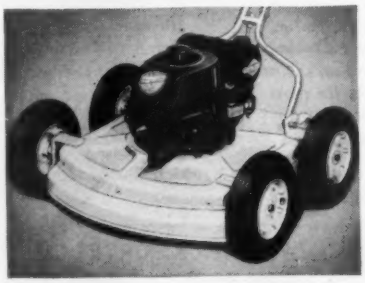

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Speedy, maneuverable rotary-scythe mower . . self or hand propelled. "Suction-Lift" action holds grass and weed clippings in suspension while blade chops them to fine mulch. Reduces raking. Precision steel construction. Powerful Briggs & Stratton engine.

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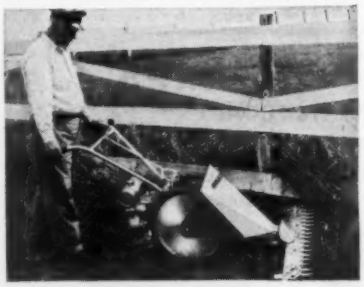

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. . . 36-inch power sickle for cutting around tank farms and oil fields. Replaces five men with hand scythes. Balanced for easy handling on rough ground, side slopes and close to obstacles. Simple to transport. Equipped with 1½ h. p. engine.

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PIPE LINES

Transco Offers Service

WASHINGTON. — Transcontinental Gas Pipe Line Corp., which recently was given Federal Power Commission approval to increase capacity of its 1,840-mile Texas-to-New York City natural-gas line from 340,000,000 to 505,000,000 cu. ft. daily, is willing and able to supply natural-gas requirements of all applicants along its main line, J. W. Burton, vice president, told FPC last week.

Burton said that Transcontinental not only could supply additional needs of Philadelphia Gas Works Co. and 100,000,000 cu. ft. daily to Northeastern Gas Transmission Corp. for distribution in New England, but could also meet recent requests by Carolina Natural Gas Corp. This gas service could be made possible by addition of one compressor unit in each compressor station along the firm's line, he said.

The testimony came during cross-examination of Transcontinental witnesses in a consolidated hearing on application for authority to carry gas to New England. The company now has contracts with Northwestern Gas Transmission Corp. for 100,000,000 cu. ft. of gas daily, which would be distributed in the New England area. Carolina Natural is seeking 30,000,000 cu. ft. daily now, and 65,000,000 cu. ft. daily within 5 years.

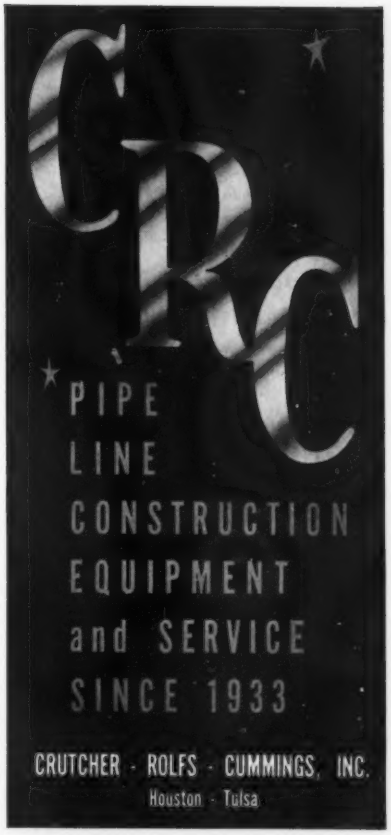
All these demands can be met by Transcontinental by a further expansion program should FPC direct the company to meet them, Burton said. He conceded that further commission authority would be necessary but that the company would be able to accomplish it.

Under-River Lines

ALBANY.—Central Hudson Gas & Electric Co. has been authorized to lay two 8-in. gas pipe lines on the bed of the Hudson River between Poughkeepsie and West Shore. An application was approved by the New York Board of Commissioners of the Land Office, which has jurisdiction of lands under the river.

Central Hudson previously had obtained approval by Army Engineers, the city of Poughkeepsie, and the town of Lloyd to lay the line. The company is laying 40 miles of 10-in. from a connection with Home Gas Co., near

GAS-LINE CONSTRUCTION.—Above is Morrison Construction Co. crew lowering doped and wrapped section of 30-in. pipe into ditch on Tennessee Gas Transmission Co.'s Corpus Christi-Charlotte, W. Va., line. This is on the 90-mile section from White Bluff, Tenn., to Glasgow, Ky.



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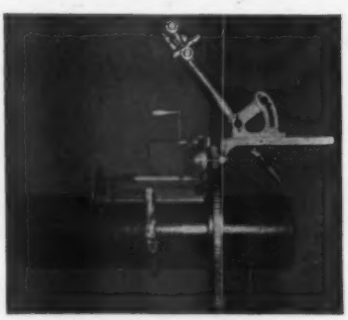

The H & M PIPE CUTTING and BEVELING MACHINE for 2 to 36-in. pipe

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PORTABILITY: Can easily be carried from one pipe section to another.
Write for Literature and new, lower prices. Out Of Rounds attachment fits all machines.

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Pipe Beveling Machine Co.
311 East Third Street, Tulsa, Oklahoma

Tuxedo, N. Y., to Poughkeepsie, and 2 miles of 8-in. lateral to Newburgh, N. Y. Federal Power Commission approved the line in 1949. Its cost has been estimated at $1,700,000.

Associated Plans Line

WASHINGTON. — Associated Natural Gas Co., Tulsa, is proposing a pipe-line project to supply natural gas to Sikeston, New Madrid, and eventually to 10 other communities in southeastern Missouri.

The firm has asked the Federal Power Commission to approve the plan, which would include construction of 14½ miles of 8⅝-in. and 21 miles of 6⅝-in. line. Hearing is now under way before the commission.

Clyde Wyant, Tulsa, director of the company, told FPC that the project would cost approximately $900,000. The line would carry an estimated 1,500,000 cu. ft. of gas daily to serve Sikeston and New Madrid.

Would Increase Capacity

BIRMINGHAM.—If Federal Power Commission approves Southern Natural Gas Co.'s proposed $33,000,000 construction project, the company will increase its rated daily delivery capacity of 420,000,000 cu. ft. of natural gas to 529,000,000 cu. ft., or 26 per cent. *(Details of the company's construction plans were announced in the Journal May 4, 1950, on page 167.)*

The company will install additional compressor capacity, construct a high-pressure transmission line from Gwinville, Miss., to Augusta, Ga., and Aiken, S. C., and loop the main line at certain points.

Southern Natural now operates about 2,100 miles of lines, including gathering facilities. Its main line runs approximately 460 miles from Monroe gas field of Louisiana to Atlanta. There are 14 compressor stations on the two 20 and 24-in. parallel lines.

Pipe-Line Volume Rises

WASHINGTON.—Volume of the three principal refined petroleum products for the first 2 months this year averaged up to 10.8 per cent higher than in the comparable months in 1949, the U. S. Bureau of Mines reported.

Products delivered from lines during January and February amounted to a total of 58,366,000 bbl., up 9.1 per cent, or 4,898,000 bbl. over those months last year.

A total of 26,558,000 bbl. was delivered from lines during February, representing a gain of 1,845,000 bbl., or 7.4 per cent over the same month in 1949. Volume of products turned into lines during the month was 27,551,000 bbl., up 9.9 per cent, or 2,489,000 bbl. from February last year.

Of the total 69 per cent was motor fuel, 21 per cent distillate fuel oil, and 10 per cent kerosine. Ratios for the 1949 period were 72 per cent motor fuel, 20 per cent distillates, and 8 per cent kerosine.

During the first 2 months of this year, motor fuel turned into lines accounted for 70 per cent of the total, with distillates accounting for 19 per cent, and kerosine 11 per cent. Ratios during this same period last year were 71 per cent motor fuel, 19 per cent distillates, and 10 per cent kerosine.

Motor fuel delivered from lines during these months totaled 39,740,000 bbl., an increase of 3,413,000 bbl., or 9.4 per cent over the same period a year ago. Distillate deliveries were up 1,944,000 bbl. to a total of 12,921,000 bbl., or a gain of 17.7 per cent.

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This offering comprises the government's interest in all minerals, gas and oil (except fissionable materials) in and under 2369.10 acres, more or less, located at Camp Fannin, near Tyler, Texas, consisting of that area lying north of the south line of the proposed Highway 155, and 2 tracts of land containing 29.36 acres and 22.10 acres lying south of said line, and the government's interest in all minerals, gas and oil (except fissionable materials) in and under 904.12 acres, more or less, located at U. S. Naval Air Facility, Hitchcock, Galveston County, Texas. (Complete legal description and maps available for inspection.)

Terms and Conditions

All the Government's interests and rights in and to all minerals, oil and gas in the above described land will be disposed of, together with rights of exploration, drilling, storing, and removing same (subject to certain restrictions for the protection of owners of the surface). Excepted however are those fissionable materials and rights therein set out in Executive Order 9908 of December 5, 1947.

Target ranges and impact areas lying in above tract and formerly used for small arms and artillery practice have been certified clear of explosive materials by Department of the Army. Therefore, no hazard from unexploded materials, if any, in such areas is believed to exist; however, no guarantee is given in this respect.

This advertisement is not a basis for negotiation and General Services Administration reserves the right to consider all bids in the light of the applicable objectives of the Surplus Property Act as amended, and the Federal Property and Administrative Services Act of 1949, public law 152, and to reject any and all proposals.

Any transfer of titles will be subject to the provisions of Executive Order 9908 relative to fissionable materials and other standard terms and conditions.

Bids for purchase must be submitted in an envelope plainly marked in the lower left hand corner: Bid on Sale of all Minerals, Oil and Gas, General Services Administration, Liquidation Service, Disposal No. PNI-188. Opening Date May 31, 1950, 11:00 a. m., CST. Bids received which are not so identified will not be considered, but will be returned to the bidder. Bids must be on approved Bid Form No. GSA-LS, PNI-188, and must contain a certified check payable to the Treasurer of the United States, in the amount of 10% of the total amount of the bid, however, no deposit shall be required in excess of $2500.00.

Inspection of the property may be made at your convenience. For the required bid form No. GSA-LS PNI-188 and further information, call or write:

General Services Administration
LIQUIDATION SERVICE
P. O. Box 6030 DALLAS 2, TEXAS
Telephone: Westbrook 3-7536, Ext. 46
GP-955

Airport Pipe Lines

KANSAS CITY.—Use of tank-truck refuelers at airports may be on the way out, members of American Petroleum Institute's Division of Marketing were told recently at a meeting here.

Aubrey Keif, The Texas Co., New York City, said that pipe-line systems instead of tank-truck refuelers may be used for transportation of aviation fuel at large airports. He is chairman of the aviation technical service committee of the A.P.I. division.

Pipe lines may be necessary, he said, because demands for aviation petroleum products are ever increasing.

Section Is Completed

HOUSTON.—Latex Construction Co. has announced that the first 25-mile section of a 54-mile, 16-in. and 12-in. gas line for Tennessee Gas Transmission Co. from Kinder to Grand Chenier, La., has been completed.

With this 25-mile, 16-in. section finished, the spread, under direction of F. A. Silar, superintendent, and C. V. Oliver, office manager, has moved to another location until the 12-in. pipe arrives.

Preliminary work will start this month by the construction firm on 95 miles of 20-in. gas line for Tennessee Gas from Natchitoches to Kinder, La., but pipe is not expected to be delivered until around July 1. Starting date on construction of 75 miles of 16-in. gas line for the company from Kinder to east of Bayou Sale, La., is still indefinite, Latex announced.

In the firm's work for Transcontinental Gas Pipe Line Corp. in southern Louisiana, one spread started April 20 on an 85-mile, 4-to-14-in. section of gathering lines. A second spread is moving in to Abbeville, La., to lay approximately 17 miles of 14-in. on this system.

On a job for Sun Pipe Line Co., work started April 25 on 19 miles of 6-in. takeup and yard reconditioning from Tallulah to Waverly La. W. H. Hayes is superintendent, and J. C. Strickler is office manager.

Shell Safety Winner

HOUSTON.—For the second time in 3 years Shell Pipe Line Corp. has won first place in the personal-injury safety contest for oil and gas pipeline companies, sponsored by the National Safety Council. The firm also placed first in the council's 1947 contest, and second in the 1948 contest.

In addition, employes in 1948 received an award of honor for distinguished service to safety from the council for working two periods of over 1,000,000 man-hours without a disabling injury.

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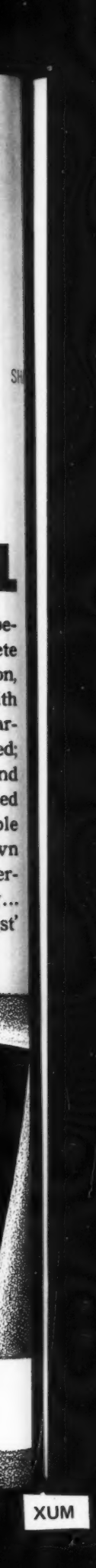

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Among the Drilling Contractors

Boxell Joins Calvert In Contracting Organization

James V. Boxell, previously district manager for Republic Supply Co. in the Illinois basin with headquarters at Salem, has become associated in an executive capacity with Calvert Drilling, Inc., Olney, Ill. He had been with Republic Supply Co. in this area for 13 years, the last 6 years as district manager. Calvert Drilling, Inc., headed by F. A. Calvert, Jr., as president, has been one of the district's most active contracting and oil-producing organizations.

Makin Keeps Four Rigs Running in New Mexico

Makin Drilling Co., Hobbs, N. M., reports it now has four rigs running in New Mexico. One is on a wildcat test being drilled for Magnolia Petroleum Co. near Roswell. Another is drilling for The Texas Co. at Buckeye. The third is working for Continental Oil Co. at Eunice. The other is on a deep test being drilled for Thomas W. Doswell and associates in the San Juan basin, in the northwestern part of the state.

Bankhead Drilling Co., Inc., Baton Rouge, has contracted for a 12,000-ft. wildcat test to be drilled for Shell Oil Co. in East Baton Rouge Parish, coastal Louisiana. Location for the test, 1 Gianelloni, is in 47-8s-1e, about 4 miles northwest of the St. Gabriel field.

Tennessee Test Drilling

Madison & Norris, cable-tool contractors, Glasgow, Ky., have a string of tools running on a wildcat test in Hardeman County, Tennessee. They are drilling for Nance & Vivadelli. The test, 1 J. B. Donaldson, SE SW NW 10-16s-8e, at latest report was driving 16-in. pipe to shut off an artesian water flow at 150 ft.

W. C. Patton, Stillwater, Okla., will drill for Johnson Oil & Refining Co. at 1 Griffeth, 13-17n-5e, 3 miles east of Cushing, southeastern Payne County, Oklahoma. The location is about ¾ mile northeast of the Happy Valley pool, across the line in northeastern Lincoln County.

Delaney Drilling Co., Tulsa, drilling for its own account, is starting a Wilcox sand exploratory test in southwestern Creek County, Oklahoma. The test, 1 Owens, is located in 4-15n-7e, which is about a mile west of the West Depew pool and 2 miles north of the Milfay pool.

Art Logan, Wewoka, Okla., is starting a 4,500-ft. wildcat test in 10-13n-4e, about 5 miles south of Chandler, Lincoln County, Oklahoma. The test, with the Prue sand as its pri-

Day-tour crew, Drilling Contractors, Ltd., Calgary, drilling for Home Oil Co., Ltd., in the Turner Valley field, 35 miles southwest of Calgary, in southwestern Alberta Province, Canada. Left to right: Gene Ham, driller; N. C. Beebe, floorman; Fred Rishog, derrickman; R. Straub, floorman; Joe Kerber, cathead operator.

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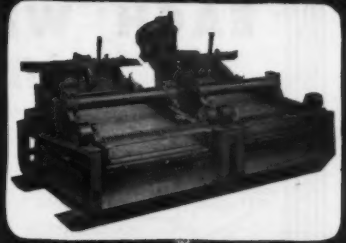

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mary objective, will be drilled for An-Son Petroleum Corp. It will be 1 B. N. Wells.

Earl F. Wakefield, Wichita, has a rig running for El Capitan Oil Co. at 1 Converse, 35-14-10e, Wabaunsee County, northeastern Kansas. Location is about 5 miles southeast of the Davis Ranch pool.

Thompson Drilling Co., Cushing, Okla., has the contract for a 3,500-ft. test which Midco Oil Corp. will drill in 14-17n-5e, 2 miles southeast of Cushing, southeastern Payne County, Oklahoma. The location is about ¾ mile northwest of the Happy Valley pool in northern Lincoln County.

Parker Drilling Co. of Canada, Ltd., Calgary, has been awarded the contract for an exploratory test, 1 Gulf-Romane, which Canadian Gulf Oil Co. will drill in the Stettler area, 95 miles northeast of Calgary, South Central Alberta Province, Canada. The location, in LSD 1, 32-36-20w4th, is about 7½ miles southwest of the Stettler field.

Norman and Graham Drilling Co., Temple, Okla., has the contract for a wildcat test to be drilled for J. A. S. Wright and Joe Engberg of Oklahoma City in 28-2s-10w, Cotton County, Oklahoma. Hole is projected to the Arbuckle lime or 4,000 ft.

ROTARY RIGS IN OPERATION*

(United States and Western Canada)

Area—	Week ended 5-1-50	Change week ended 4-24-50	Change week ended 5-2-49
Gulf Coast	512	+11	— 23
W. Tex.-N. M.	722	+ 2	+151
Ark.-N. La.-E. Tex.	131	— 5	— 17
Oklahoma	255	— 2	+ 4
Kansas	122	—10	+ 7
Illinois-Eastern	120	+ 2	— 24
Rocky Mountains	72	+ 1	— 33
Pacific Coast	115	— 8	— 89
Total United States	2,049	— 9	— 24
Western Canada	49	—14	— 32
Total	2,098	—23	— 56

*Courtesy Hughes Tool Co.

Helmerich & Payne, Inc., Tulsa, drilling for its own account, is starting a 10,000-ft. test at 1 Flowers, Section 79, Gunter & Munson Survey, Roberts County, Texas Panhandle. The location is southeast of production being developed by Sinclair Oil & Gas Co. in the new Lips Ranch field.

Commonwealth Drilling Co., Calgary, has moved a rig to a wildcat location 4½ miles southeast of Turin, 23 miles northeast of Lethbridge, South Central Alberta, Canada, where it has a contract to drill a Devonian test for Anglo Canadian Oil Co., Ltd., and associates. Location is in LSD 6, 29-11n-18w4th.

Long Brothers Drilling Co., Oilton, Tex., is drilling Daubert & Achning 2 J. M. Bennett, a wildcat test in the CEPI&M Survey 37, 15 miles west of Benavides, Duval County, South Texas. Hole is projected to 4,200 ft.

Aylward Drilling Co., Wichita, has moved a rig to a wildcat location 2 miles southwest of the West Morel pool, Graham County, western Kansas, where it will drill for Sunray Oil Corp. at 1 Smith, 30-9-21.

Smiley, Little & Myers Drilling Co., Oklahoma City, is the contractor on the deep wildcat test which Carter Oil Co. is starting at 1 Hemphill, 36-10n-23w, 3 miles east of Sayre, Beckham County, Oklahoma. The test is projected to 10,000 ft.

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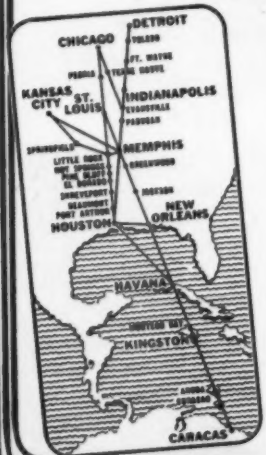

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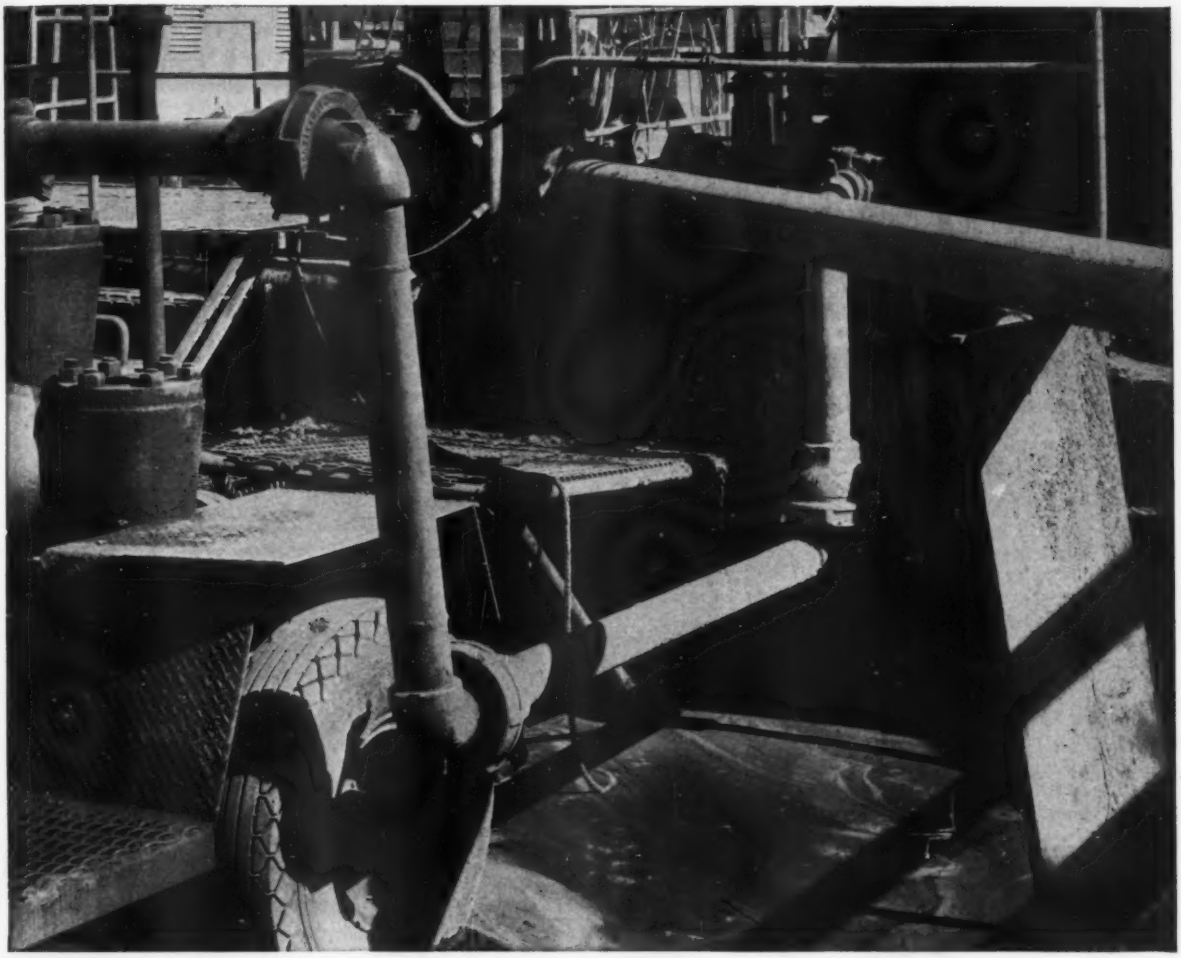

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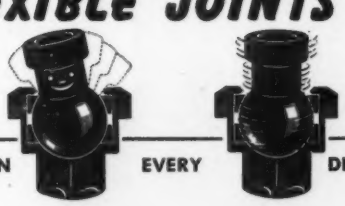

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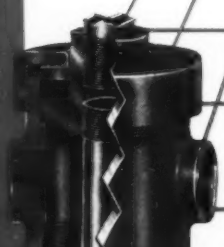
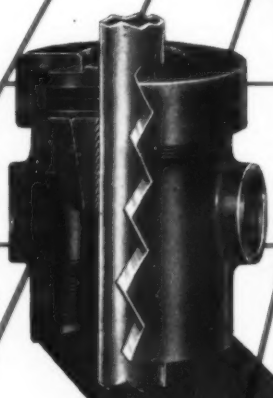


Type M



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NATURAL GAS

New Firm Being Formed

LITTLE ROCK. — A multimillion-dollar gas-transmission and distribution company is being formed that will operate in a 21-county area in Arkansas.

Plans for the company were disclosed by Sidney McMath, governor of Arkansas; D. P. Raney, Little Rock bond broker, and C. Hamilton Moses, president of the Arkansas Power & Light Co. The proposed company has an agreement to purchase gas properties from A. P. & L. for a sum said to be between $2,000,000 and $3,000,000.

It is reported that the new concern is being formed by T. J. & Sons and Womeldorff & Lindsey, Little Rock bond firms, and Equitable Securities Corp. of Nashville, these companies to be equal partners.

Plans of the company call for it to spend between $12,000,000 and $14,000,000. The company will build a line across the Mississippi River from a line of the Texas Gas Transmission Co. at a cost of $800,000. In addition it will establish distribution facilities in several Arkansas towns where it now has franchises and in others where franchises will be obtained.

A. P. & L. said that it did not want to sell its gas properties but that the disfavor with which federal regulatory bodies look upon power companies that sell gas caused them to do so.

To Seek Lower Increases

LOS ANGELES. — Southern California Gas Co.'s requests for rate increases totaling $16,700,000 yearly will be decreased between $3,500,000 and $4,000,000 as a result of a study by the company's depreciation practices and accurals, F. M. Banks, vice president and manager, announced last week at a hearing of the California Public Utilities Commission.

Company engineers, he said, have filed a report of their study of the firm's financial status, and the study indicated a depreciation reserve requirement of $37,860,000 on a 5 per cent sinking-fund basis, as compared to a reserve on the books of $79,960,000.

Price Fixing Studied

TOPEKA.—The question of Kansas Corporation Commission's power to fix a minimum price for natural gas in the Hugoton gas field has been taken under advisement by the Kansas Supreme Court.

The commission's interim order setting a minimum price of 8 cents per 1,000 cu. ft., upheld in district court, was appealed to the supmere court by three pipe-line companies, Northern Natural Gas Co., Kansas-Nebraska Gas Co., and Panhandle Eastern Pipeline Co.

The pipe-line firms contend the commission has no authority, express, or implied, to regulate the price of gas, and that the commission's order violates their constitutional rights.

The Kansas Corporation Commission's attorneys argued that it has power to fix a minimum price through its statutory duty and authority to prevent waste.

Rate Increases Suspended

WASHINGTON. — Rate increases proposed by Atlantic Seaboard Corp. and Virginia Gas Transmission Corp. for wholesale natural-gas service have been suspended by the Federal Power Commission pending hearing and decision. The increases were proposed to be made effective May 1 for service to several customers, and would have amounted to about $349,780 annually, based on anticipated sales for the 12-month period ending April 30, 1951.

The commission at the same time permitted rate reductions proposed by Atlantic and Virginia Gas to several other customers to become effective as of May 1. The reductions total approximately $84,415 for the same 12-month period. In addition, a rate schedule and service agreement filed by Atlantic to provide for the beginning of firm service to Consolidated Gas Electric Light & Power Co. of Baltimore was accepted and made effective.

FPC said, however, that the tariffs and service agreements which were allowed to become effective would be further investigated to determine whether any aspects of them are "unjust, unreasonable, unduly discriminatory or preferential."

Natural Gasoline

L.P.G. Firms Sued

WASHINGTON. — The Department of Justice filed two suits in the federal District Court at Phoenix, Ariz., last week, charging the Butane Corp. and Fannin's Gas & Equipment Co. with violation of the antitrust laws in the sale of liquefied petroleum gas.

The suits charged that the defendants make uniform leases with their customers under which the latter may lease storage tanks only on the condition that they will not buy liquefied petroleum gas from a competitor. The department asked the court to require the two companies to cancel all such existing lease contracts.

A department announcement of the suits said that each of the defendant companies sells approximately $1,000,000 of butane and propane gas in Arizona annually, accounting between them for approximately 40 per cent of the liquefied petroleum gas sold in the state, and asserted that a substantial part of the market has been foreclosed to competitors as a result of the use of the total-requirements contract which the Government seeks to ban.

Industry spokesmen attached considerable importance to the suits, seeing in them the first step of a possible drive by the department to follow up on the Supreme Court decision in the Standard Oil Co. of California case which involved tying contracts with service stations, to free both distributors and consumers from control by their suppliers.

While it was said that the contracts complained of are common throughout the L.P.G. branches of the industry, it is believed the Government selected the two Arizona companies because each of them controlled a substantial part of the market and the "effect upon competition" could more readily be developed than where individual companies did only a small part of the total business.

It was pointed out that the Government has long been attempting to break down the system of tying contracts wherever they are used, and it was recalled that some years ago it lost a suit against Sinclair involving the lease or loan of pumps to service station operators, but on grounds somewhat different from those in the Standard Oil case.

Sinclair Buys Interest

NEW YORK.—Sinclair Oil & Gas Co. has announced purchase of one-half interest in the physical assets of the former Lisbon Gasoline Co., Inc.

Assets consist of two natural-gasoline extraction plants with field gathering and residue systems, located in the south end of East Texas field. More than 1,400 wells with a production of 10,000,000 cu. ft. of casinghead gas supply the plants. The facilities have a productive capacity of 60,000 gal. of natural gasoline and butane and 40,000 gal. of propane daily.

The newly acquired facilities will process that part of the gas now being processed by Sinclair's Plant 19 which remains after the plant has reached its economic limit, the company said.

At the expiration of present existing gasoline sales contracts, products from the project will be available to Sinclair. Arkansas Fuel Oil Co. owns the remaining half interest.

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Canadian Exploration Status

ABOUT a year ago it seemed that important wildcat strikes were popping in all directions in Canada. An exploration and land play of proportions seldom seen anywhere, and probably not anticipated by Canadians in their wildest dreams a few years previously, was attracting oil men to Canada, and particularly to Alberta. What has happened since?

In one sense, very little has happened. Leduc, Redwater, and Stettler still look like the only major finds. Golden Spike turned out to be a reef pinnacle with only a small surface area. There have been other strikes, but they don't loom as particularly big — at least as of now. Meantime a host of dry holes have been drilled in wildcat territory. That is, at first impression, it seems like a lot. But then you get to looking at the amount of territory involved, and it is immediately apparent that the density of testing is extremely low compared to much oil territory in the United States.

Right now there is an undercurrent of feeling that something is about due to break. This feeling is fairly general, and it doesn't center on any one wildcat test, or even on any group of tests in an area. It's just one of those indefinable psychological hunches that seem to infect a whole lot of oil men about the same time. As oil men know, these hunches don't always pan out—but on the other hand, fairly often they do turn out to be good.

What will happen if a big strike doesn't come in pretty soon? Will there be a let down in the interest in Canada? The answer is "yes, of course there will be some let down." Many people and considerable sums of outside venture capital have been attracted here in the past 2 years, with little oil background. They came expecting every strike to be a bonanza pool, a major field. These people are due for a let down sooner or later, because nature just doesn't seem to distribute oil fields in quite that liberal fashion.

There are two groups, however, that won't be affected so far as their long-range programs are concerned. The first group consists of those tough Canadian independents who survived the long, lean period between Turner Valley and Leduc. All the faint hearts were weeded out of that group long ago.

The second group consists of the representatives of American oil companies who learned the ups and downs of the oil business over a period of years in many places. They are here to stay because none of the things have changed that made western Canada look like a promising place to find and develop oil for the next quarter to half-century.

In the opinion of both these groups, all that has happened so far is that the law of averages is catching up on Alberta. Experience in the United States and most other parts of the world shows that major fields are rare finds. Alberta hit the jackpot two or three times almost in a row on the first few plays. A lean streak, or at least a payoff smaller than a jackpot, was to be expected for a time after that.

This isn't the first time something like that experience has come to oil men. It has happened not once but several times in the Gulf Coast, in West Texas, on the Nemaha Ridge play in Oklahoma, in the Seminole area, in the Rocky Mountain area, in the Illinois basin, in California, in fact in almost every oil region.

Meantime, while not attracting too much attention, it is now evident that the D-2 zone in the Devonian will produce substantial quantities of oil in many places, and should not be overlooked completely by the magic attraction of the more famous D-3 zone. Furthermore, Cretaceous sands are present in places, and will produce oil in some of these places where presumably draping over a lower reef has formed a trap. Oil has been found near the Madison lime pinchout. If the gas-pipe-line problem is settled before the present gas-pipe-line boom in the United States loses momentum, and venture capital is still interested in financing gas lines, then gas development prospects will give the exploration play more sustaining power.

Charles J. Deegan.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

ROCKY MOUNTAIN AREA.—California Co. will reportedly run casing to around 8,700 ft. at its important wildcat in the Gusher area in northeastern Utah. British-American is swabbing 1½ bbl. of black oil from the Cloverly at its Logan County, Colorado, wildcat. In the Huntsman area, Ohio Oil Co. is now getting additional gas producers from the third Dakota.

WEST TEXAS.—Magnolia Petroleum Co. 1 Garza Land & Cattle Co., NW SE 431-9-ELRR, southeast Lynn County wildcat, about 16 miles southwest of Post in Garza County, flowed oil on a drill-stem test in the Pennsylvanian, which had a possibility of being reef limestone, according to some reports. The section from 8,615-30 ft. had gas in 8 minutes, oil-cut mud in 1 hour and 47 minutes, and oil 3 minutes later. It cleaned into pits for 29 minutes, then tanked 14 bbl. of 41°-gravity oil in 1 hour. Top of the pay was 8,615 ft., on elevation of 2,920 ft. In Kent County, Barnsdall and Seaboard 1 Spires, Canyon discovery, completed for a daily potential of 400 bbl. of oil.

MISSISSIPPI.—Humble Oil & Refining Co. has perforated the lower Tuscaloosa sand at 10,154-60 ft. in its 1 James S. Giles, 4-7n-3w, Adams County. On a 4½-hour test, the well flowed at the rate of 115 bbl. of 54.4°-gravity condensate daily through ⅛-in. choke. Tubing pressure was 2,600 psi. In the same county, Humble completed the 2 Caroline F. Blake, 23-5n-32, for 176 bbl. of 40.6°-gravity oil daily through ⅛-in. choke. Casing was perforated in the Wilcox at 6,431-35 ft.

XUM

SOUTH LOUISIANA

Shell Completes Offshore Wildcat as Producer

NEW ORLEANS. — Final completion has been made on Shell Oil Co.'s South Main Pass offshore wildcat, the 1 State Lease 1008. The well flowed 49 bbl. of 22.7°-gravity oil daily through an 11/64-in. choke with tubing pressure at 350 psi. Total depth of well is 12,129 ft., and production is through perforations at 6,530-34 ft. The new producer is located 660 ft. from the east line and 660 ft. from the north line of Block 24, off Plaquemines Parish.

Placid Oil Co. and The Texas Co. are bringing in a new oil-discovery well at their 1 State of Louisiana-LL&E 5, Plaquemines Parish. On initial test, the well flowed 9 to 10 bbl. of 44°-gravity oil hourly through a ⅛-in. choke, with tubing pressure at 1,200 psi., and casing pressure at 600 psi. The hole was drilled to a depth of 10,029 ft. and plugged back to 4,100 ft. for completion attempt. This new discovery is approximately 3 miles south of the Lake Washington area, in 1-21s-26e.

A flow of low-gravity oil and salt water was tested in Kirby Petroleum Co. 1 Maggie McCain Kerr, 11-9s-1w, Acadia Parish wildcat, through perforations at 10,846-51 ft. Operator squeezed off those perforations and is testing perforations from 10,800-20 ft. The wildcat is bottomed at 11,012 ft. and has 5½-in. oil string cemented at 10,972 ft. This prospective field opener is located 4 miles northeast of Egan production and approximately 4 miles southwest of North Cowley production.

Hunt Oil Co. has completed an excellent confirmation test to Manila Village field, Jefferson Parish. Hunt's confirmation try, the 1 Louisiana Land & Exploration Co., 38-18s-24e, was reported to have flowed 28 bbl. of pipe-line oil per hour through a ¼-in. choke, on a 4-hour test, an average rate of 624 bbl. daily. Gravity was 29° and tubing pressure was 4,100 psi. Perforations were at 12,787-95 ft., and operators are not certain the well is tapping the same sands found in the discovery well for the field.

The 25 new locations include 2 wildcat starts, 1 each in Cameron and Terrebonne parishes. There were no successful exploratory wells reported; however, two were dry, one each in Acadia and Iberia parishes.

SOUTH LOUISIANA WILDCAT FAILURES

Acadia Parish: Bateman Drilling Co. 1 I&E Longman, 63-9s-2w, 1 mi. W of Jennings production, dry, TD 10,513 ft.
Iberia Parish: Continental Oil Co. 1 Mistrot & Patout, 25-12s-6e, 2½ mi. S of New Iberia, dry, TD 12,052 ft.

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APPALACHIAN FIELD

Three Successful Wildcats In Limestone Hill Area

PITTSBURGH. — Three successful Oriskany wildcats were completed in the Limestone Hill area, West Virginia: Steel district, Wood County, Hope Natural Gas Co. 1-9409 A. J. Holbert, elevation 760 ft., gaged 10,361,000 cu. ft. of gas after shot, (1-hour rock pressure 1,575 psi.), Corniferous lime 4,896-5,016 ft., Oriskany sand 5,016 ft., gas 5,018-5,030 ft., total depth 5,038 ft.; Columbian Carbon Co. 1-1144 Harry Beard et al, elevation 1,028 ft., gaged 11,356,000 cu. ft. of gas natural, (48-hour rock pressure 1,500 psi.), Corniferous lime 5,210-5,340 ft., Oriskany sand, gas 5,342-5,352 ft., total depth 5,352 ft.; and Tucker district, Wirt County, United Fuel Gas Co. 6552 R. J. Moore, elevation 944 ft., gaged 778,000 cu. ft. after shot, Corniferous lime 5,175-5,302 ft., Oriskany sand 5,302-5,345 ft., gas 5,321-5,326 ft., total depth 5,349 ft.

Five good shallow sand gas wells were reported: Harts Creek district, Lincoln County, United Fuel Gas Co. 4-6459 fee, elevation 1,045 ft., tested 1,783,000 cu. ft. after shot, Big lime and Brown shale, total depth 3,785 ft.; Harvey district, Mingo County, E. C. Ware 3 G. D. Marcum, elevation 879 ft., resulted in 6,710,000 cu. ft. of gas, Brown shale, total depth 2,769 ft.; Trap Hill district, Raleigh County, Columbian Carbon Co. 1-GW-1141 John M. Dunn, elevation 2,062 ft., tested 1,784,000 cu. ft. after acidizing, Big lime, total depth 3,100 ft.; Adkin district, McDowell County, Godfrey L. Cabot, Inc., completed two good gas wells: 33-1311 Pocahontas Land Corp., elevation 1,706 ft., gaged 1,485,000 cu. ft. after shot, Weir sand 3,791-3,940 ft., Berea sand 4,330-4,342 ft., gas 4,329-4,337 ft., total depth 4,345 ft.; and 34-1312 Pocahontas Land Corp., elevation 1,678 ft., gaged 1,595,000 cu. ft. after shot, Weir sand 3,601-3,808 ft., Berea sand 4,221 ft., gas 4,229-4,233 ft., total depth 4,241 ft.

Twenty-three new locations in West Virginia were reported during the past week: Washington district, Boone County; DeKalb district, Gilmer County; Union district, Jackson County; Freemans Creek district, Lewis County; Harts Creek district, Lincoln County; Grant district, Nichols County; Grant district, Pleasants County; Teays Valley district, Putnam County; Trap Hill district, Raleigh County; Clay, Grant, and Murphy districts, Ritchie County; Harper district, Roane County; Grant and Union districts, Wayne County; Clay and Walker districts, Wood County.

Wharton Township, Fayette County, Pennsylvania, William E. Snee et al 3 Indian Creek Coal & Coke Co., elevation 2,615 ft., is bailing, after acidizing. The gas now tests 65,000 cu. ft. Napier Township, Bedford County, South Penn et al-Snee & Eberly 1 Jesse B. Miller, elevation 1,66 ft., is still fishing.

Seven new locations in Southwest Pennsylvania were reported during the past week: Harrison Township, Allegheny County; Beaver Township, Jefferson County; Amwell, North Bethlehem, Nottingham and West Bethlehem townships, Washington County.

In Garrett County, Maryland, Eberly & Snee 1 Geo. H. Blocher, elevation 2,614 ft., reached the Onondaga at 5,025 ft. with a Brown Break at 5,040 ft. and topped the chert at 5,081 ft.; Fox & Trimble 1 Edw. Kite, elevation 2,520 ft., also drilling in this formation.

WEST VIRGINIA SUCCESSFUL WILDCATS

Wood County, Steele district: Hope Natural Gas Co. 1-9409 A. J. Holbert, elev. 760 ft., 10,361,000 cu. ft. of gas, after shot, (1-hour rock pressure 1,575 psi.), Corniferous lime 4,895-5,016 ft., Oriskany sand 5,016 ft., gas 5,018-5,030 ft., TD 5,038 ft.

Columbian Carbon Co. 1-1144 Harry Beard et al, elev. 1,028 ft., 11,356,000 cu. ft. of gas, natural, (48-hour rock pressure 1,500 psi.), Corniferous lime 5,210-5,340 ft., Oriskany sand, gas 5,342-5,352 ft., TD 5,352 ft.

Wirt County, Tucker district: United Fuel Gas Co. 6552 R. J. Moore, elev. 994 ft., 778,000 cu. ft. gas, after shot, Corniferous lime 5,175-5,302 ft., Oriskany sand 5,302-5,345 ft., gas 5,321-5,326 ft., TD 5,349 ft.

TEXAS GULF COAST

New Wilcox Discovery In Swearingen Area

HOUSTON.—C. N. Housh has opened a new Wilcox oil-field discovery in the Swearingen area of Tyler County. The operator's 1 Charles Kieke came in for an estimated 150 bbl. of 42°-gravity oil per day through a 3/32-in. choke. Hole is bottomed at 8,400 ft. and production is through perforations bottomed at 8,384 ft. The location is in BBB&C Survey, Abstract 108, 3 miles south of East Hillister oil field.

New pay has been opened in Hitchcock field of Galveston County at Stewart Petroleum Co. 22 Maco Stewart, James Spillman Survey. The well flowed gas and a spray condensate through a 3/16-in. choke from 5,417-22 ft. Working pressure was 2,125 psi. The test was drilled to 7,282 ft. and 5½-in. casing was set at 5,490 ft. The well is now shut in awaiting a potential gage.

In Goliad County, Ranger & Coffield are waiting on potential gage at the 1 W. Karnei, new gas-field discovery 5 miles southwest of Weesatche field and ¾ mile southeast of Melrose field. The test was drilled to a depth of 8,250 ft. and perforations were made just below 7,900 ft. The well recovered gas and condensate on test.

Sun Oil Co. has set a string of 9⅝-in. protective casing to total depth of 10,300 ft. in the 1 Brandt, Henry Barker Survey, Chambers County. Test is scheduled to go to a depth of 12,500 ft. to test sands productive in South Mayes field, 2 miles west-southwest.

Hankamer Investment Co. 1 Ike Laughlin, wildcat on the El Maton prospect in Matagorda, is drilling below 9,940 ft. in sandy shale following a gas kick at 9,850 ft., which was successfully controlled by increasing mud weight. An electrical log was run on the section, but failed to reveal anything outstanding at that level. This wildcat lies in the J. H. Updike Survey, 8 miles southeast of Blessing.

The 41 new locations include 7 wildcat starts, 1 in Chambers County and 2 each in Goliad, Live Oak, and Victoria counties. There were three successful exploratory wells completed, one each in DeWitt, Wilson and Hardin counties, while seven were dry, one each in Brazoria, Galveston, Orange, Polk and Tyler counties, and two in Live Oak County.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

DeWitt County: Gas-condensate discovery—Shell Oil Co. 1 Hubert Heaton, Thomas Berry Sur., A-82, 6 mi. SE Stratton, TD 9,000 ft., perf. 7,727-50 ft., IP: 152 bbl. condensate plus 7,700,000 cu. ft. of gas per day, 5/16-in. choke, TP 1,650 psi., 56.8° grav.

Hardin County: New oil discovery—General Crude Oil Co. et al 1 Ester Hooks et al, J. D. Knight Sur., A-353, 2 mi. SW Kountze, TD 8,511 ft., top pay 8,252 ft., perf. 8,252-54 ft., IP: 133 bbl. oil per day, ⅛-in. choke, TP 1,875 psi., 45° grav.

Wilson County: Gas discovery—Hewit & Dougherty 1 T. D. Mansford, Jess F. Rodriguez Sur., A-263, 6 mi. NW of Gillette, TD 7,315 ft., perf. 4,279-83 ft., IP: 10,000,000 cu. ft. of gas, open flow, SIP 1,672 psi.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Brazoria County: Progress Petroleum Co. of Texas 1 Ben H. Faber, Wiley Martin Sur., A-83, 5 mi. N West Columbia, dry, TD 9,216 ft.

Galveston County: John W. Mecom D-3 D. Ker Cade et al, north flank of High Island dome, Martin Dunman Sur., dry, TD 7,860 ft.

Live Oak County: H. H. Howell 1 H. D. Miller, Hooper & Wade Sur. 193, Abst. 257, 2 mi. SE Legarto field, dry, TD 4,460 ft.

Curtis Singleton Drilling Co. 1 Roy & William Hinnant, William Griffin Sur., 16 mi. S of George West, dry, TD 6,106 ft.

Orange County: John W. Mecom 1 Norma N. Adcock, Rose City area, Gilvert Stephenson Sur., A-167, 2 mi. E Rose City, dry, TD 10,042 ft.

Polk County: L. W. Campbell 1 D. J. Gerlack, Augustine Viesca Sur., A-77, 5 mi. SW Goodrich, dry, TD 4,757 ft.

SOUTHWEST TEXAS

Humble Completes Kenedy County Test

CORPUS CHRISTI.—Humble Oil & Refining Co. has completed the 1 Santa Fe Ranch-Julian Pasture for a gas discovery 14 miles southeast of Encino, San Salvador Del Tule Grant, Kenedy County. The well flowed 5,100,000 cu. ft. of gas per day with the gas-condensate ratio 10,260 to 1. Drilled to a depth of 12,458 ft., production is through perforations at 11,058-93 ft. Test was an open-flow gage.

Tiger Minerals, Inc. is completing the 2-A W. R. Peters Estate for an oil discovery 14 miles southwest of Freer in Duval County. The well was drilled to a depth of 1,736 ft. and perforated from 1,728-35 ft. Operators are now preparing to install pump for final completion. This new discovery is located in the GB&CNG RR Survey 39 and is 1,734 ft. north of the 1-A Peters, a junked hole.

Sullivan & Agrnett have opened new pay in Lamar field of Aransas City at the 4 A. T. Vineyard et al, Reserve Tract B Survey. The hole is at a depth of 9,629 ft. and 7-in. production casing was run to 9,696 ft. A drill-stem test was run on the open hole from 9,606-29 ft., using ¼-in. choke, and 1,200 ft. of water cushion. In 5 minutes, the well flowed oil and gas and developed 1,800 psi. maximum working pressure. Gravity was 48°. Operators have now run tubing and are cleaning the well.

Rand Morgan has recompleted the A-10 fee, a dually completed well, for a new pay recovery in Farenthold field, Nueces County. The casing completion was originally through perforations at 5,821-23 ft. for 31 bbl. of 44.2°-gravity oil per day

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through a 5/32-in choke. The perforations were squeezed and reperforated in a new sand from 5,654-56 ft. with 10 shots. The well flowed 135 bbl. of 44.2°-gravity oil through a ½-in. choke. It is located in Richard King Farm Lots of the Casa Blanca Grant.

The 53 new locations include 11 wildcat starts, 1 each in Guadalupe, Medina, Williamson, Kenedy, San Patricio, Webb and Willacy counties, and 2 each in Duval and Nueces counties. There was one successful exploratory test completed in Kenedy County, while five were dry, one each in Williamson, Brooks, Duval, Jim Hogg, and San Patricio counties.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCAT

Kenedy County: Gas discovery — Humble Oil & Refining Co. 1 Santa Fe Ranch-Julian Pasture, San Salvador Del Tule Grant, 14 mi. SE Encino, TD 12,458 ft., perf. 11,058-93 ft., IP: 5,100,000 cu. ft. of gas per day, open flow.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Brooks County: Cox & Hamon 1 Leroy Denman, Block 69, Sudb. 4, Copita Farms and Garden Tracts, 15 mi. W Falfurrias, dry, TD 5,078 ft.

Duval County: Sid Katz et al 2 Lucille Gruy Estate, S. G. Hayes Sur., A-1737, 8 mi. E Bruni, dry, TD 3,205 ft.

Jim Hogg County: Calohan & Campbell 1 Holbein, Share 3, Hogg Ridge Subd., Las Animas Grant, 17 mi. SE Mirando City, dry, TD 2,604 ft.

San Patricio County: Union Oil Co. of California 1 J. T. Birttian, West Taft area, Theo. Carroll Sur., A-93, 3 mi. NW Taft, dry, TD 8,503 ft.

Williamson County: L. S. Powell 1 C. C. Heine, William Byerly Sur., 6 mi. NE of Coupland, dry, TD 1,358 ft.

N. CENTRAL TEXAS

Discoveries Reported in Jones, Clay Counties

WICHITA FALLS. — Week's completions included flowing Strawn discoveries in Jones and Clay counties.

In Jones County, 5 miles east of Hamlin, Oxford Drilling Co., of Albany (formerly Ungren & Frazier 3 Culbertson) 1 J. L. Culbertson drilled to 5,059 ft., then drill-stem tested from 5,049 ft. Gas came to the surface in 8 minutes, and the well headed oil after some pipe had been pulled. No estimate was made of the amount recovered, or flowed. On potential test it gaged 275 bbl. of 43°-gravity oil a day through ¾-in. choke, with gas-oil ratio of 1,228 cu. ft. Five-inch casing was set at 5,037 ft. Location is 446 ft. from east and 1,263 ft. from south lines, Section 6, GH&H Survey.

Ungren & Frazier 2 J. C. Culbertson, 3,413 ft. from north and 1,640 ft. from east lines of the same section, was waiting on potential after flowing 14 bbl. of oil in 1 hour through ¼-in. choke, on a drill-stem test at 3,235-50 ft., in the Swastika. Top on the Swastika was 3,232 ft. First drill-stem test, from 3,234-44 ft., open 4 hours, had gas in 43 minutes and recovered 220 ft. of oil. The second test from 3,335-50 ft., open 1 hour and 45 minutes, had gas in 11 minutes and recovered 1,725 ft. of oil. Five-inch casing was set at 3,238 ft.

The same operators' 1 J. F. Boren, G. Martinez Survey 194, 1 mile north of Hawley in Jones County, was waiting on completion after flowing oil by heads from the Flippen at 2,009-16 ft. The amount of flow was not reported.

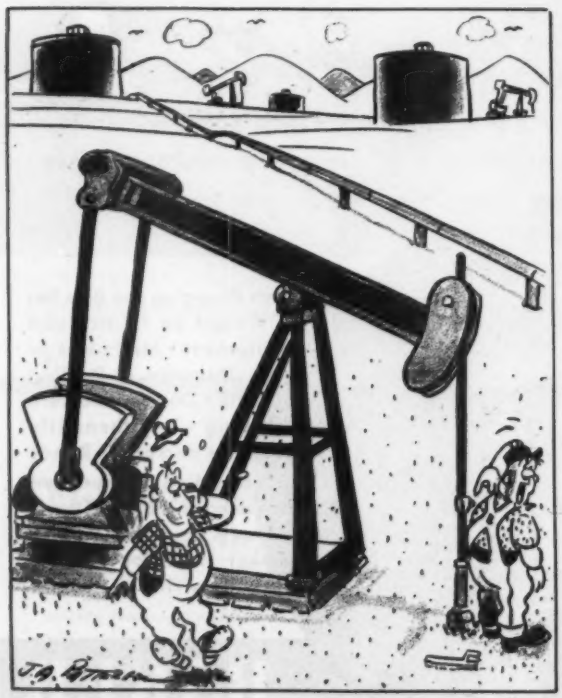
South-central Clay County's discovery was L. T. Burns 1 R. M. Tate, T. F. Bates Survey, A-13, which flowed 300.9 bbl. of 43°-gravity oil in 6 hours, through ¾-in. choke.

New exploration in Jack County included H. N. Crocker, of Bowie, 1 J. J. Campbell, in the H. M. Riley Survey, A-288, 6 miles south of Post Oak and about 4 miles south of Campsey-Ellenburger field. Two tests were planned, both to 3,800 ft. with rotary. The 1 Campbell was located 309 ft. from east and 1,767 ft. from south lines of the survey, and the 2 Campbell was located 718 ft. to the north, in the same survey.

In Nolan County, Ryan, Hayes & Burke 1 S. B. Moore, 181-64-H&TC, wildcat in the southeast part of the county, continued testing in the Ellenburger, topped at 5,792 ft. A drill-stem test from 5,807-22 ft. had gas in 70 minutes and recovered 50 ft. of heavily oil and gas-cut mud, plus 100 ft. of clean oil. A 2½-hour test from 5,814-31 ft. recovered 30 ft. of gas-cut mud, 100 ft. of heavily oil and gas-cut mud, plus about ½ gal. of free oil. Flowing pressure was 30 psi., and 300 psi. when shut in 20 minutes. Total depth was 5,831 ft. At last report, operators were coming out of the hole after testing from 5,814-31 ft. The tool was open 2 hours and a fair blow was made throughout.

In Montague County, The Texas Co. 1 P. E. Boedecker, wildcat 4½ miles southwest of Queen's Peak field and 4 miles northwest of Bowie, Section 2,852, TE&L Survey, prepared to drill-stem test to 7,173 ft., total depth. A previous 2-hour test from 7,054-70 ft. recovered 60 ft. of slightly oil and gas-cut mud. Bottom-hole pressure was 200 psi. A test from 7,070-7,120 ft., open 2 hours, recovered 20 ft. of mud.

Continental Oil Co. 1 Mollie Wilson, West Minor field well 2 miles northwest of Montague in the J. Winn Survey, A-868, recovered 30 ft. of heavily oil and gas-cut mud on a drill-stem test of the Bend conglomerate at 6,044-53 ft. A test from 6,117-39 ft. had gas in 15 minutes and recovered 3,600 ft. of free oil. Bottom-hole pressure was



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1,775 psi. It was drilling ahead at last report.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Clay County: Falcon-Seaboard Drilling Co. 1 Ambrose Douthitt, Sec. 22, Montague CSL, 10 mi. NE Henrietta, TD 5,995 ft., Ellenburger pay 5,978-95 ft., pumped 72 bbl. of 40°-gravity oil a day.

Stephens County: James H. Snowden 2 Jesse Lenoir, G. C. Peveler Sur., 4 mi. S Woodson, TD 2,847 ft., elev. 1,194 ft., sand pay 2,822 ft., flowed 115.8 bbl. of 39.6°-gravity oil a day, 15/64-in. choke, GOR 346 cu. ft., CP 450 psi., TP 425 psi.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: Childs & Riddle 1 Minnich, Jose Ostane Sur., A-333, 2 mi. N Archer City, dry, TD 1,085 ft., elev. 1,016 ft.

Neeld & Hood Drilling Co. 1 B. W. Garvey, Sec. 1,862 ft., TE&L Sur., A-543, 8 mi. SE Anarene, dry, TD 3,355 ft.

Cooke County: Broadway Drilling Co. and Redman Bros. 1 J. Wheeler, R. Ledbetter Sur., A-801, 5 mi. NE St. Jo, dry, TD 2,558 ft.

Jack County: Chas. H. Kadane 1 Ellas Riley Est., J. J. Stephens Sur., A-535, 3½ mi. E Jacksboro, dry, TD 6,448 ft.

Jones County: Ungren & Frazier 1-A Mattie V. Alexander, Sec. 2, I&GN Sur., 10 mi. SW Anson, dry, TD 3,404 ft., elev. 1,860 ft., Flippen lime around 2,864 ft., Gunsight lime around 3,209 ft.

Mills County: United North & South Development Co. 1 Fred Johnson, Uziak Wakefield Sur., 7 mi. E Zephyr, dry, TD 4,050 ft.

Parker County: Cities Service Oil Co. 1 G. O. Hutcheson, Sec. 88, L. L. Tackett Sur., A-2268, 5 mi. SW Springtown, dry, TD 7,028 ft., elev. 1,098 ft., Marble Falls 5,525 ft., Barnett 6,469 ft., Ellenburger 6,700 ft.

San Saba County: Bryan Edwards 1 Oris Golden, F&M Sur. 763, 6 mi. NW San Saba, dry, TD 2,048 ft., elev. 1,350 ft., Marble Falls 1,060 ft., Mississippian 1,153 ft., Ellenburger 1,253 ft.

Shackelford County: J. E. Roberts 1-A Tull Newcomb, Sec. 5, Alk. A, AB&M Sur., NW corner of county, dry, TD 1,911 ft.

Taylor County: J. H. Rice and George B. Rice 1 W. T. Birdet, K. K. Leggett Sur., 4 mi. N Tye, dry, TD 2,680 ft., elev. 1,714 ft.

Wichita County: Joe Reznik 1 C. H. Horn, Tarrant CSL, 2 Mi. W Iowa Park, dry, TD 4,500 ft., elev. 1,018 ft.

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CANADIAN FIELDS

Oil Success Assured In Stettler Well

CALGARY, Alta.—British Empire Oil Developments, Ltd., with D2 oil success assured at its second Stettler well, logged D3 low and found it water bearing. Hole has been plugged back to D2 zone of Devonian, casing set, and crew is swabbing preliminary to placing the well on production.

British Empire No. 2, LSD 5, 27-38-20w4, topped D2 about 25 ft. higher than the company's initial well, tested, and confirmed oil production from that horizon. D2 was fully penetrated and the hole went down in search of D3. D3 was found at 5,448 ft., but it was water loaded.

No. 2 well topped D2 at 5,172 ft., a subsea elevation of 2,449 ft. (K.B. elevation 2,723 ft.). No. 1 well, ¼ mile south, topped D2 at 5,194 ft., 2,373 ft. subsea (K.B. 2,720 ft.).

A team of three Calgary independents, McDougall-Segur Exploration Co., Alberta Pacific Consolidated Oils, Ltd., and Sunset Oils, Ltd., has obtained oil at a Leduc well located on an Imperial Oil, Ltd., farmout. The new success, third for the group on the quarter-section tract, flowed oil during D3 drill-stem test.

McConset-Leduc No. 4, LSD 9, 34-49-26w4, ¼ mile south of No. 2 producer, tested interval 5,390-5,405 ft. and flowed oil in 18 minutes. Crew is now swabbing prior to running potential test.

Northern Development Co., Alberta drilling contractor and participant in development, has taken on a quarter-section farmout along the southwest fringe of Leduc oil field, and is now rigging up for drilling of first well. The farmout was obtained from British American Oil Co., Ltd., and Leduc Leaseholds, Ltd., a team which has so far completed five D2 zone oil wells to the east of the farmout quarter in the same section of the freehold land.

Northern's test, P. D. No. 1, has been staked in LSD 11, 1-50-27w4, ¼ mile west of B.A.-Leduc Leaseholds No. 3 D2 oil well.

Seventeen wells were completed in Alberta during the past week, all successful field completions, drilled at Redwater, Leduc-Woodbend, Gilbert, and Excelsior. The week's new wells boosted total completions since the beginning of this year to 244, including 172 oil wells, 7 gas wells, and 65 failures.

Redwater headed the list of completions again last week, yielding 10 oil wells. Imperial, Oil, Ltd., accounted for five of the successful oil wells; the "Pacific Group" for three; Western Leaseholds, Ltd., and the Barnsdall-Honolulu-Seaboard-Los Nietos team, one each.

Five oil wells were completed in the Leduc-Woodbend area, one each by the Home-Anglo-C. & E. team, Home Oil Co., Imperial, Pan Western Oils, Ltd., and the Hargal Oils Group.

Continental Oil Co. of Canada placed another oil well on steady flow in the Gilbert Lower Cretaceous pool, while Imperial placed its fourth Excelsior well on production.

A recently formed Calgary independent has staked location for two drilling tests

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in Alberta, one an extension effort on the northwest fringe of Redwater and the other a stepout exploratory venture in the Excelsior area of central Alberta. The independent, Legion Oils, Ltd., is a private company formed with Calgary capital by the law firm of Baron & Baron.

Initial well, in the Redwater area, is Legion Oils No. 1, LSD 5, 23-58-22w4, located ⅜ mile northwest of C.A.P.P.-Redwater No. 3-23E dry hole and ¼ mile north of C. A.-P.P. No. 4-23E.

Legion's second well, in the unproven area of Excelsior, is Coastal-Legion No. 1, LSD 3, 15-56-24w4, ½ mile southeast of Leduc Calmar's failure and 1 mile north-northeast of currently proven limits.

EASTERN CANADA

CHATHAM. — Reopened early in April after the winter shutdown, 1 Continental-Gaspe, drilled by Gaspe Oil Ventures, Ltd., indicated increased volume and pressure, which was still further improved when the 2-in. tubing was lifted and rerun, after changing the bottom perforations. In an early test the well gushed clean crude above the derrick, till the flow was diverted to storage. Heavy snow and bad weather, interrupting communications, interfered with completion of the tests, which will be resumed when the weather improves. Plans are being completed for an 18-well drilling program.

MICHIGAN

Sun Testing Apparent Producer in Bishop

MOUNT PLEASANT.—Sun Oil Co. was testing what appeared to the first commercial Traverse lime producer to follow the discovery well in the new Bishop field, Garfield Township, Newaygo County.

Company's 2 Wood, NW SE SE 19-12-13w, swabbed and flowed 47 bbl. of oil and 4 bbl. of salt water first 24 hours after acid treatment with 200 gal. Traverse lime was logged at 2,231 ft. and hole was bottomed out at 2,234 ft. Well swabbed 11 bbl. of oil natural. The 2 Wood is the direct east 20-acre offset to the discovery. Sun previously drilled the diagonal southwest offset to the discovery which was dry in the Traverse. From the 2 Wood, rotary tools were moved to the 1 Hall, NW SW SW 20-12n-13w, the east offset to the new producer. This third test to follow the discovery was scheduled to be under test in the Traverse within 7 days.

In Paris Traverse oil pool, Mecosta County, Cities Service Oil Co. reported that a 1,694,000-cu. ft. Stray sand gas pay was drilled at company's B-1 Redner, NW NW NW 27-16n-10w, Green Township. Stray sand was logged at 1,173 ft. Well showed gas in 4 minutes on drill-stem test with drill-pipe packer set at 1,169 ft. and anchor bottomed out at 1,186 ft. Five feet of water was showing after 2 hours. Hole was reamed to 1,189 ft. and drilling was resumed with the Traverse oil zone the test's next objective. The B-1 Redner is the direct east 20-acre offset to a Traverse producing well.

East Pullman field developing companies were watching a test located ½ mile due west of the nearest producer in this Allegan County oil pool. The important test, Pascal Broughton 1 Varga, SE NE SW 6-1n-15w, was below 465 ft. early this week. Traverse objective will probably be logged at about 1,135 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Casco Township: J. H. Fitchett 1 Ridley, NW SE NE 8-1n-16w, Traverse 1,128 ft., dry, TD 1,164 ft.

Cheshire Township: Norman L. Stevens 1 Garton, SE NW SW 20-1n-14w, Traverse 1,266 ft., dry, TD 1,294 ft.

Isabella County, Coe Township: Merrill

Drilling Co. 1 Ulsh, NW SW NE 8-13n-3w, Brown lime 1,258 ft., dry, TD 1,262 ft.

Oceana County, Otto Township: P. K. Degenther 1 State-Otto, SE SE SE 32-13n-16w, Traverse 1,858 ft., dry, TD 1,895 ft.

CALIFORNIA

Deepening, Redrilling Account for Much Activity

LOS ANGELES.—Deepening and redrilling of oil wells in recent weeks has accounted for a substantial percentage of California's drilling activity. Of the premits filed with the Division of Oil and Gas in the past 3 weeks, 88 were for new wells while 65 were for deepening and reconditioning jobs. For the first 4 months, this work accounted for about 35 per cent of the total drilling activity. Much of the work consists of deepening old wells in Placerita field, or in reworking oil producers in Wilmington field which have been damaged by earth slippage.

One of the most outstanding developments was the announcement that Continental Oil Co. and Standard Oil Co. of California would jointly drill a 7,500-ft. wildcat in northeast Nevada. Located in 31-16n-46e, in White Pine County, the well will be the first ever drilled in the state by a major oil company. The test will be carried as the 1 Meridian Unit, and is scheduled to start drilling in about 30 days. It will be about 45 miles west of Ely.

In California at the Tapo Canyon area of Ventura County, one of the oldest oil-producing regions in the state, additional development appears in the making. Aeco Corp. has acquired a spread of 800 acres in Sections 13, 14, and 15-3n-18w, and has staked location for a confirmation test in Section 13.

It was in this area, midway between Tapo and Simi fields, that John McQuaid last March completed the 1 Tapo for a 41-bbl. per day pumper at a total depth of 542 ft. The Aeco test will be a northwest offset to the McQuaid discovery.

In Kings County and about 8 miles northwest of Trico gas field, Shell Oil Co. last week abandoned its 1 Mortgage Service Co. Located in 13-23s-21e, and ⅞ mile southeast of its gas-discovery well of 2 months ago, hole was carried to 3,758 ft. Sections between 2,763 and 2,845 ft. were tested but yielded only small flows of gas.

Two other unsuccessful wildcats abandoned last week were Richfield Oil Corp. 25-10 Russell-A in Cuyama Valley and the Dohney-Battson-Lytle test in the Sylmar area of Ventura County. The former, 1¾ miles east of southern limits of Russell Ranch field, in 10-10n-27e, was dry at 5,340 ft. The Sylmar test, the operator's 1 "Stetson-Sombrero," was in 21-3n-15w, and dry at 8,250 ft.

CALIFORNIA WILDCAT FAILURES

Contra Costa County, Martinez area: Ardly Petroleum Co. 2 Almond, 31-2n-2w, dry, TD 3,116 ft., elev. 411 ft.

Kern County, East Cuyama area: Independent Exploration Co. 71-29 Stubblefield, 29-10n-24w, dry, TD 2,458 ft., elev. 3,069 ft.

Kern River area: Seaboard Oil Co. 1 Mitchell, 27-28s-28e, dry, Pyramid Hills 3,097 ft., first Vedder 3,126 ft., second Vedder 3,384 ft., TD 3,463 ft., elev. 730 ft.

Lost Hills area: Standard Oil Co. of California 45 Van Sicklin, 36-27s-21e, dry, TD 14,597 ft., elev. 320 ft.

Northeast Edison area: So-Hi Oil Co. 1 So-Hi, 8-30s-30e, dry, Sant Margarita 365 ft., Wicker equivalent 1,300 ft., TD 1762 ft., elev. 932 ft.

Pattiway area: Superior Oil Co. 85-26 L. M. Hudson et al, 26-10n-24w, dry, TD 5,884 ft., elev. 4,249 ft.

Round Mountain area: A. C. Fisher et

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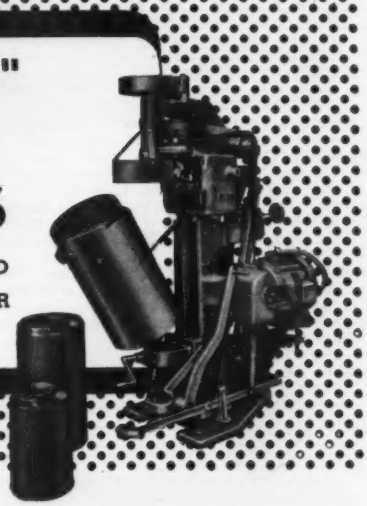

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al 1 F.M.B.-Cauzza, 9-28s-29e, dry, TD 1,748 ft., elev. 1,348 ft.

Tunis Creek area: D. K. Associates 84-29 Corral, 29-11n-18w, dry, Santa Margarita 486 ft., TD 1,615 ft., elev. 818 ft.

Los Angeles County, Aliso Canyon area: Union Oil Co. 2 Mission-Adrian, 34-3n-16w, dry, TD 7,580 ft., elev. 1,877 ft.

Placerita area: A. C. Myers 2 Nadau, 28-4n-15w, dry, TD 3,427 ft., elev. 1,500 ft.

Riverside County, Corona area: Mankin, Johnson & Johnson 1 Case, 34-4s-6w, dry, TD 2,000 ft., elev. 1,160 ft.

Sacramento County, Rio Vista area: Brazos Oil & Gas Co. 1 E. H. Wheeler, 23-4n-3e, dry, Domengene 3,925 ft., Midland 4,598 ft., TD 5,654 ft., elev. 5 ft.

Santa Barbara County, Goleta area: Yellowstone Oil Co. Y-2 Hollister, 3-4n-29w, dry, TD 1,275 ft., elev. 325 ft.

Ventura County, Packwood area: Richfield Oil Corp. 1 Apache Unit, 22-8n-24w, dry, TD 10,563 ft., elev. 3,828 ft.

Simi area: W. E. Newell et al 1 Newell-Lattner, 14-2n-18w, dry, TD 1,820 ft., elev. 982 ft.

OHIO FIELDS

Pay Limit Extended In Clinton Field

COLUMBUS.—The narrow neck of Clayton field was found to extend further eastward when the Mid-East Oil Co. moved ¼ mile beyond the Adrain well to the 2 David Hammer, Section 11, Clayton Township, Perry County. The Clinton sand (at 3,429-67 ft. with good oil showings) was shot with 110 qt. and made 127 bbl. in 24 hours.

In the South Roseville pool two good wells were completed. The National Gas 3 Rebecca Sowers, Section 9, Harrison Township, Perry County, logged the Clinton at 3,485-3,530 ft. with a good show of oil which 94 bbl. in 24 hours after a 120-qt. shot. On the north edge of Crooksville, Sharp & Davis 1 Crooksville China, Section 16, 17, made 53 bbl. after a 115-qt. shot.

The Preston Oil Co. 6 Glennis Taylor, Section 3, Bedford Township, Meigs County, came in as a fair well. The Berea sand was shot at 1,697-1,714 ft. and made 25 bbl. in 24 hours.

Another well for Richville pool was completed by M. B. Belden on V. and E. Weaver, Section 25, Perry Township, Stark County. The Clinton at 4,547-68 ft. gaged 1,150,000 cu. ft. of gas natural, and 1,300,000 cu. ft. when shut-in after shot.

OHIO WILDCAT FAILURE

Harrison County, Short Creek Township: Hannah Coal Co. 1 fee, Sec. 13, no Gordon, TD 1,990 ft.

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MISSISSIPPI

Humble Runs Squeeze Job On Adams County Test

JACKSON.—Humble Oil & Refining Co. has run a squeeze job on the 1 James S. Giles et al, 4-7n-3w, Adams County, and reperforated from 10,154-60 ft. with 36 shots. On a 4½-hour test the well flowed at the rate of 115 bbl. of 54.4°-gravity condensate and 429,600 cu. ft. of gas per day through a ⅛-in. choke. Tubing pressure was reported at 2,600 psi. Further testing was discontinued because of flow lines freezing and operators are now installing heater so that an accurate completion gage can be made. Operators feel certain that the well is a gas-condensate discovery, although drill-stem test in the Baker horizon of Wilcox indicated possible oil production.

Northwest of Ellislie field, Adams County, Humble has completed the 2 Caroline F. Blake, 23-5n-3w, in the Parker horizon of the Wilcox. Casing was perforated at 6,431-35 ft. with 16 shots, and on 6-hour gage, the well flowed at the rate of 176 bbl. of 40.6°-gravity oil daily through a ⅛-in. choke. Tubing pressure was 680 psi. and casing pressure was 770 psi.

Completion of this well further complicates the problem of nomenclature for the area. First complication came when the Humble 1 Robinson, 20-5n-3w, was completed from the Armstrong sand, but produced 29.1°-gravity crude. This indicated a second reservoir from Ellislie field, which produces 38°-gravity crude from the same horizon and is located 1½ miles southeast. The Humble 1 Barksdale, 26-5n-3w, a south offset to the Robinson well, was completed from a sand 137 ft. below the Armstrong section. The newest completion, Humble 2 Blake, approximately 3,100 ft. northeast of the Robinson well, has been completed from another sand.

In Copiah County, Southeastern Drilling Co. 1 Brown has resumed drilling after cutting three cores between the interval 10,189-10,212 ft. with no shows. Drilling was resumed at 10,212 ft. and the well is now at a depth of 10,285 ft. and operators are preparing to core again.

The seven new locations in Mississippi include three wildcat starts, one in Clarke County and two in Adams County. There was one successful exploratory test completed in Adams County, while one was dry in Perry County.

MISSISSIPPI SUCCESSFUL WILDCAT

Adams County: New oil pool—Humble Oil & Refining Co. 2 Caroline F. Blake, 23-5n-3w, TD 6,437 ft., top sand 6,411 ft. (Parker or Wilcox), perf. 6,431-35 ft. IP: 176 bbl. oil per day, ⅛-in. choke, TP 680 psi., CP 770 psi., 40.6° grav.

MISSISSIPPI WILDCAT FAILURE

Perry County: Humble Oil & Refining Co. 1 G. L. Reasor, 12-4n-9w, dry, TD 8,004 ft.

OKLAHOMA

Good Well Indicated in McClain County Wildcat

DISCOVERY of another good Bromide sand pool appears to have been made by Greenbrier Oil Co. at its 1 Wentzell, NE NW NW 33-8n-3w, northern McClain County. In a drill-stem test of the Bromide at 10,668-93 ft., the well flowed clean, 39.6°-gravity oil at an estimated rate of 40 bbl. per hour. When pipe was broken down, 2,370 ft. of oil was recovered.

The test, with tool open 60 minutes, was made through ½-in. top and bottom chokes. Gas was at the surface within 25 minutes and the 2,000-ft. water cushion was unloaded within 26 minutes. Oil started flowing within the next 16 minutes. Flowing pressure at the surface was 745 psi. Indicated bottom-hole flowing pressure was 3,350 to 4,000 psi. With the well shut in, pressure built up to 4,600 psi. in 15 minutes.

The well, located 7 miles due east of Blanchard and about 8 miles southwest of Norman (Cleveland County), is about 2 miles west of the Southwest Goldsby pool, where good production has been developed in the same section, although somewhat higher within recent months.

Eight miles to the north, Producers Development Co. has opened a new pay zone, the Viola lime, for the Southeast Newcastle pool, located on the McClain-Cleveland County line. Its 1 Neher & Meadors, C SW SW 20-9n-3w, flowed at the rate of 120 bbl. of oil per day through 14/64-in. choke following acidization. Total depth is 9,605 ft. Casing, run to 9,558 ft., was preforated in the Viola at 9,357-9,430 ft. Main pay zone of the pool has been the Hunton lime.

Wilcox Oil Co. is deepening its 1 Dugger, C NW SE 12-10n-22w, Beckham County wildcat, following a drill-stem test through casing perforations at 10,266-306 ft. The test recovered 350 ft. of oil-cut mud. Perforations were opposite at Granite Wash section in which samples had carried fluorescence, and through which 7-in. casing had been run to 10,615 ft. Prior to running casing, no drill-stem test had been made. Present total depth is 10,623 ft. The well is a mile north of the Doxey townsite and about 7 miles west of the Elk City field.

Production of the Elk City field has been extended ½ mile north at its northwestern extremity with the completion by Shell Oil Co. of its 1-B Kelly, C SW SE 5-10n-21w. With casing perforated at 9,805-50 ft., the well flowed 381 bbl. of 58.7° oil with 1,776,000 cu. ft. of gas in 24 hours through 17/64-in. choke.

Another pay zone, the Cleveland sand, has been proved in the South Langston pool, Logan County. The new zone discovery well, Alpha Petroleum Co. and Eugene Jordan 1 Kemp, NE NE SE 1-16n-1w, is being put on the pump after swabbing tests in which it produced 120 bbl. of oil per day. Casing is perforated at 4,301-10 ft. Bottom of the hole is 5,098 ft. Other wells in the pool, opened late last year, produce from the Misener sand.

Herndon Drilling Co. 1 Harjo, NE NE SE 27-12n-9e, a wildcat northwest of Okemah, Okfuskee County, flowed 36 bbl. of oil with 3,000,000 cu. ft. of gas per day from Cromwell sand, opposite which casing had been perforated at 3,269-75 ft. Total depth is 3,277 ft. with 5½-in. casing at 3,275 ft.

OKLAHOMA SUCCESSFUL WILDCATS

Beckham County: Shell Oil Co. et al 1 State of Oklahoma "F," C SE SW 12-10n-22w, flowed 303 bbl. of 49°-gravity oil per day from conglomerate at 10,004-20 ft. through 24/64-in. choke, TD 10,160 ft., 1¼-mi. extension to Elk City. Shell Oil Co. 1 Kelly "B," C SW SE 5-

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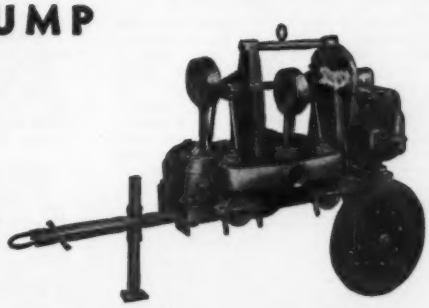

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10n-21w, flowed 381 bbl. of 58.7°-gravity distillate from conglomerate at 9,805-50 ft. through 17/64-in. choke, TD 10,23 ft., ¾-mi. extension to Elk City.

Carter County: Parker Drilling and Rockhill Oil Co. 1 Yell, NW NW NW 35-4s-1w, pumped 15 bbl. of 28.2°-gravity oil per day from sand at 4,967-81 ft., TD 6,517 ft., Anadarcho 3,503 ft., upper Bayou 3,978 ft. with no show, Chubbie 4,460 ft. with no show, Deese 4,981 ft., Lone Grove 5,400 ft., sand 5,916-26 ft.

Garfield County: Northern Oklahoma Gas Co. 1 Ensminger, SW SE SE 12-24n-3w, flowed 1,660,000 cu. ft. of gas (with 3 bbl. of oil and 3 bbl. of water) from Mississippi lime at 4,569-4,610 ft., TD 4,876 ft., Pawhuska 2,305 ft., Hoover sand 2,555 ft., Oread 2,670 ft., Endicott 2,765 ft., sand 2,920 ft., Tonkawa sand 3,374 ft., Layton sand 3,680 ft., Big lime 4,030 ft. and 4,150 ft., Oswego 4,200 ft., Cherokee 4,330 ft., Verdigris 4,355 ft., Skinner 4,406 ft. with no show, Woodford 4,798 ft., dolomite 4,842 ft., sandy dolomite 4,864 ft., Wilcox 4,870 ft.

Marshall County: Miller Bros. 1 Taliaferro, NW SW SE 23-5s-5e, pumped 3 bbl. of 45°-gravity oil per day from Arbuckle sand at 450-60 ft., TD 462 ft., extension to Madill.

Payne County: Morgan & Jordan 1 Moorman, SE SE NW 31-18n-2e, pumped 15 bbl. of 41.8°-gravity oil a day from Skinner at 4,330-40 ft., TD 5,096 ft., Deer Creek 1,652 ft., LeCompton 1,800 ft., Elgin 1,839 ft., Oread 2,233 ft., sand 2,242 ft., Avant 2,808 ft., second Avant 2,835 ft., Dewey 2,965 ft., Layton 3,206 ft., Hogshooter 3,487 ft., lower Layton 3,542 ft., Checkerboard 3,644 ft., lower Checkerboard 3,803 ft., Oswego 4,105 ft., Cherokee 4,260 ft., Prue 4,292 ft., Verdigris 4,321 ft., lime 4,340 ft., Burgess 4,422 ft., Mississippian 4,622 ft., Woodford 4,757 ft., Hunton 4,798 ft., Sylvan 4,863 ft., Viola 4,944 ft., first Wilcox 5,021 ft., second Wilcox 5,085 ft.

Washita County: Carter et al 1 Galloway, NE NE NW 22-8n-18w, flowed 38 bbl. of 28°-gravity oil per day from granite wash at 5,312-55 ft., open tubing, TD 7,616 ft.

OKLAHOMA WILDCAT FAILURES

Cotton County: Wolfe 1 Perry, NW NW SE 15-3s-13w, dry, TD 1,801 ft., no log.

Creek County, So. Kellyville district: Security Drilling Co. 1 Tiger, SW SW SW 27-17n-10e, dry, TD 2,952 ft., Oswego 1,438 ft., Prue (?) 1,637 ft., Verdigris 1,655 ft., Skinner 1,745 ft., with a show of oil, Red Fork 1,950 ft., Inola 2,080 ft., Bartlesville 2,135 ft., Dutcher 2,546 ft., Mississippian 2,605 ft., Woodford 2,885 ft., Viola 2,911 ft., first Wilcox 2,928 ft.

Garfield County: Deardorf Oil Corp. 1 Gungoll, C SW NE 11-20n-8w, dry, TD 7,209 ft., Chase 2,200 ft., Neva 2,835 ft., Pawhuska 3,660 ft., upper Layton 5,658 ft., Checkerboard 6,136 ft., Oswego 6,242 ft., show of oil 6,300-25 ft., Atoka 6,547 ft., Chester 6,749 ft., Manning 6,840 ft., Mississippi lime 7,155 ft., show of oil 7,190-7,200 ft.

Logan County: Deardorf Oil Corp. 1 State Tract, NW NW SW 9-17n-2w, dry, TD 5,820 ft., Avant 3,755 ft., Dewey 3,810 ft., Hogshooter 4,445 ft., Checkerboard 4,590 ft., Big lime 4,880 ft., Mississippi lime 5,256 ft., Woodford 5,385 (?) ft., Misener-Hunton 4,880 ft., Sylvan 5,450 ft., Viola 5,540 ft., dolomite lime 5,618 ft., first Wilcox 5,689 ft.

Pawnee County: The Texas Co. 1 Smith, NE SE NW 13-22n-3e, dry, TD 4,220 ft., Avant 2,625 ft., Peoples Layton 2,660 ft., Hogshooter 2,818 ft., Layton 2,885 ft., Lenopah 3,138 ft., Oswego 3,290 ft., lime 3,578 ft., Red Fork 3,652 ft. and 3,690 ft., Mississippian 3,834 ft., Woodford 4,134 ft., sand 4,170 ft., Wilcox 4,205 ft.

Pontotoc County: Weatherly 1 Hynds, SE SW NW 24-4n-6e, dry, TD 1,557 ft.

Pottawatomie County, Sacred Heart district: Kingerly & Patterson 1 Jackson, SW NW SE 20-6n-5e, dry, TD 2,979 ft., base Wewoka 2,309 ft., Calvin 2,442 ft., Senora lime 2,642 ft., Earlsboro 2,792 ft., no sands, Mayes 2,926 ft.

Seminole County, Garcreek area: Ashland Oil & Refining Co. 1 Campbell, NW NE NW 16-10n-7e, dry, TD 3,803 ft., Inola 3,295 ft., Bartlesville 3,300 ft., lime 3,455 ft., Booch 3,569 ft., Gilcrease 3,637 ft., lower Gilcrease 3,700 ft., Union Valley 3,720 ft., Cromwell 3,734 ft., lower Cromwell 3,760 ft.

Stephens County: Loco area: Lederman 1 Lowery, SE NW NW 31-2s-5w, dry, TD 2,522 ft., Loco lime 1,390 ft., detrital Arbuckle 2,296 ft., Arbuckle 2,456 ft.

Tillman County: Crockett 1 Tant, SE NE SE 10-3s-14w, dry, TD 1,805 ft., shale 1,492 ft.

Treadwell Q Stuenkel 1 Hash, NW SW NE 9-1n-18w, dry, TD 1,595 ft. in chert, lime 995 ft. with a show of gas.

LA.-ARK.

New Producing Formation In Old Shallow Area

SHREVEPORT.—C. M. Murphy & Co. completed its 1 Pepper, NE SE NE 32-18s-15w, as a dual well from two zones of the Cotton Valley, which added a new producing formation to an old shallow (Nacatoch) area. The well has been officially designated as the discovery of Catesville field by the state conservation department.

The well was drilled to 7,922 ft., in the Smackover, which had several oil shows, but plugged back to 7,700 ft. in the Cotton Valley. From perforations in the Jones sand at 7,574-80, 7,603-10, and 7,620-30 ft., the well flowed 93 bbl. of 43°-gravity oil a day through ⅜-in. tubing choke. Tubing pressure was 25 psi. Stray sand perforations from 6,602-10 ft. gaged 231 bbl. of 39°-gravity oil a day, through 12/64-in. choke, under casing pressure of 350 psi.

Successful completion of the 1 Pepper has aroused considerable interest, but Murphy 1 Sue Olson, approximately NE NE 32-18s-15w, a north offset, was drilled to 7,825 ft., in the Smackover. Both the Jones sand and the Smackover carried salt water. Last drill-stem test, from 7,692-7,700 ft., using 1,000 ft. of water cushion, recovered the water cushion and 840 ft. of salt water in 20 minutes. Operators were running casing and planned to test in two stray Cotton Valley sands, which may prove productive, according to field reports.

Pan American Southern Corp. 1 A. C. Magee, 19-17s-25w, Miller County, was drilling in the Glen Rose at 5,945 ft.

Burnett Drilling Co. 1 V. B. May, Nevada County wildcat in 8-14s-22w, was drilling below 5,035 ft. By samples, the well had base of the massive anhydrite at 2,520 ft., an oil sand, presumed to be the Hill, from 2,546-60 ft., Travis Peak at 3,295 ft., and the Cotton Valley formation at 4,110 ft.

Garland Anthony Oil Co. 1 Mike Berg, 15-13s-17w, was drilling at 4,005 ft., in Smackover lime.

In Ouachita County, F. A. Fuller 1 Blair, 8-14s-18w, 7 miles north of the Wesson field, bailed salt water with a slight show of oil from perforations at 1,819-22 and 1,822-32 ft. Total depth was 2,510 ft., in the Travis Peak.

Crow Drilling Co. was reported ready to abandon its 1-A Moresi, SW NE SW 15-22n-14w, Bossier Parish wildcat, at 3,060 ft., in the Upper Cretaceous. Perforations from 2,890-95 ft. were acidizied and flowed salt water.

Sinclair Oil & Gas Co. 1 Oden, 33-19n-13w, Bossier Parish, was drilling at 8,294 ft., in the Cotton Valley, topped around 8,000 ft.

Bert Fields 1 Thigpen-Herold, Caddo Parish test in 23-16n-16w, was reported swabbing salt water from perforations at 8,650-82 ft. in the "D" sand of the Cotton Valley.

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ROCKY MOUNTAIN

Utah Tight Hole To Run Casing

DENVER.—Drilling on the Gusher wildcat, Uintah County, Utah, has been discontinued and the California Co., operator of the unit, is now reportedly planning to run casing for further testing. The well is at 9,752 ft., total depth, and the company has released no information other than drilling depth since the well was started. This test is 6 miles southeast of the Carter Oil Co.-Stanolind Oil Co. discovery well at Roosevelt. Carter and Stanolind are producing oil from the basal Green River (Tertiary) at Roosevelt with the well around 9,200 ft., total depth. This discovery was considered of great importance for future drilling operations through the Uintah Basin. The California Co., following seismic work in the area, unitized a block immediately southeast of the Roosevelt area and started the present test. It is now reported but not confirmed that California will plug the well back to around 8,900 ft. and cement 7-in. casing at around 8,750 ft. for tests of two zones in basal Green River (?) where oil was logged. In recent weeks there has been considerable leasing activities throughout all of central and southern Uintah County with California, Carter-Stanolind, Gulf Oil Corp., Union Oil Co. of California, and others leasing in the area. Outcome of the present test is very important for this area. At Roosevelt, Carter is now drilling its second well located ½ mile east of the discovery. Carter and Stanolind are also drilling in the Blue Bell area at 1 Unit, C SW NE 6-1s-2w, Duchesne County, with the well below 5,000 ft.

At 1 Segelke, NE NW NE 26-11n-53w, Logan County, Colorado, British-American Oil Producing Co.-Plains Exploration et al., are now swabbing 1½ bbl. of 17.1°-gravity black oil from the top of the Cloverly between 5,606-21 ft. Casing was perforated opposite this zone after the operator swabbed water from the zone between 5,623-43 ft. There is no water being produced from the present zone. This sand has previously been classified as Lakota. However, there is no definite correlation of this general area properly defining the Lakota sand and the operator has now classified the producing section as Cloverly. British-American found more than 10,000,000 cu. ft. of gas daily in the first Muddy sand and tested some light green oil in the second Muddy in this well. Upon completion of tests in the Cloverly it is expected that the company will test the zone where green oil was recovered.

In Cheyenne County, Nebraska, the Ohio Oil Co. has completed its extension at Reuhmann, SW NE NW 18-14n-49w. The well gaged 8,000,000 cu. ft. of gas per day from the third Dakota sand. It was drilled to 4,913 ft., total depth, and plugged back to 4,842 for completion. This is Ohio's third gas completion in this field and the well is an extension south of the Huntsman discovery. Ohio is also testing its 1 Brockelsby extension 1 mile northwest of its discovery with the well making 4,280,000 cu. ft. of gas daily. Tests of Ohio 1 Gurscke indicate that it will be a 150-bbl. per day pumper. Production is from the third Dakota sand. The well is 3 miles northwest of the Huntsman strike. Meanwhile, Ohio has spudded its East Sidney wildcat at 1 Schnell, now drilling below 885 ft. It may be a deep test in this area.

There were 24 new locations during the week with 14 in Wyoming, 3 in Montana, 4 in Colorado, 3 in Nebraska, and 1 in Idaho. In Montana, location was announced for two interesting wildcat tests: Glen H. McCarthy, contract let to Loffland Brothers for a 9,000-ft. wildcat in the Hardin area, Big Horn County; Texas Pacific Coal & Oil Co. announced location for an Amsden test in the Big Wall Area at 1 State, C SW SW

29-10n-28e, Musselshell County. In Wyoming, new wildcat locations were announced in the Sussex-Muddy Creek area, Johnson County: H. P. MacCauley-Dorough's Lakota test at South Muddy Creek on a farm-out arrangement with Sinclair Oil & Gas Co.; Amil Anderson's Tensleep test in the Mayoworth area northwest of Sussex. In Idaho, Couger Oil Co. is drilling a wildcat in the Malta area, Cassia County.

There were 11 completions with 9 in Wyoming, and 1 each in Colorado and Montana. One wildcat new pay was completed in the Hidden Dome area of Wyoming with the reworking of an old Tensleep producer: the Ohio Oil Co. perforated casing opposite the Embar and made a dual completion with the well pumping 154 bbl. of oil per day from both formations. A wildcat failure was completed by Milo Siegel in the East Rifle area, Garfield County, Colorado. The well was drilled to 1,058 ft. and although shows of oil were found in the Weber the formation was not productive.

WYOMING SUCCESSFUL WILDCAT

New pay in Hidden Dome area, Waskakie County: Ohio Oil Co. 2 TP-OPC 2, NW SE SE 31-48n-90w, TD 4,726 ft., OWWO, Tensleep 4,530 ft., Amsden 4,685 ft., perforated Embar 4,249-88, 157 shots, pumped 154 bbl. of oil per day from Embar and Tensleep.

COLORADO WILDCAT FAILURE

East Rifle Creek area, Garfield County: Milo B. Siegel 1 V. Bowen, Lot 3, 3-5s-92w, dry, TD 1,058 ft., Morrison surface, Chinle 465 ft., Shinarump 755 ft., Weber 895 ft.

EASTERN TEXAS

Wood County Wildcat Tests Black Oil

DALLAS.—Watson W. Wise 1 J. E. Brown, Wood County wildcat in the J. C. Clark Survey, was a prospective discovery or extension 1 mile northwest of Merigale-Paul field, on the basis of a drill-stem test in the sub-Clarkeville sand. The 2½-hour test from 4,430-70 ft. recovered 2,496 ft. of 20°-gravity black oil. The well was drilled ahead to 4,744 ft., and a 3-hour test from 4,733-44 ft., in the Eagleford, yielded 30 ft. of black oil. Five-inch casing was set at 4,440 ft. and operators prepared to run

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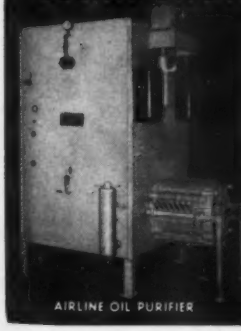

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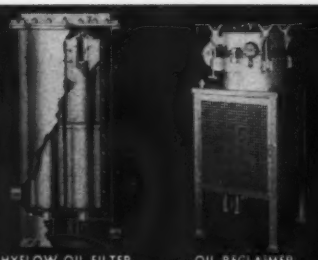

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production tests in the sub-Clarksville. Location is 5 miles northeast of Quitman.

F. R. Jackson 1-A C. B. Kennedy, 3 miles southeast of Pine Mills in the David Gilliland Survey, was drilling ahead following a 15-minute drill-stem test in sand from 5,362-78 ft. Recovery was 4,280 ft. of 21°-gravity oil, plus 120 ft. of oil-cut mud. Operators believe the well will surpass in production Pine Mills' first Woodbine producer which made about 170 bbl. of oil a day.

Location for a new 5,000-ft. Woodbine wildcat was staked by Gene Goff, Midland, 5 miles south of Brownsboro, Henderson County, in the R. C. Morris Survey, 330 ft. out of the southeast corner of the west 40 acres of the Richardson 82-acre tract in the southwest corner of the survey. Operations were scheduled to start by June 1. Location is on a block of around 4,500 acres.

EAST TEXAS (DISTRICTS 5, 6, AND 6-P) WILDCAT FAILURES

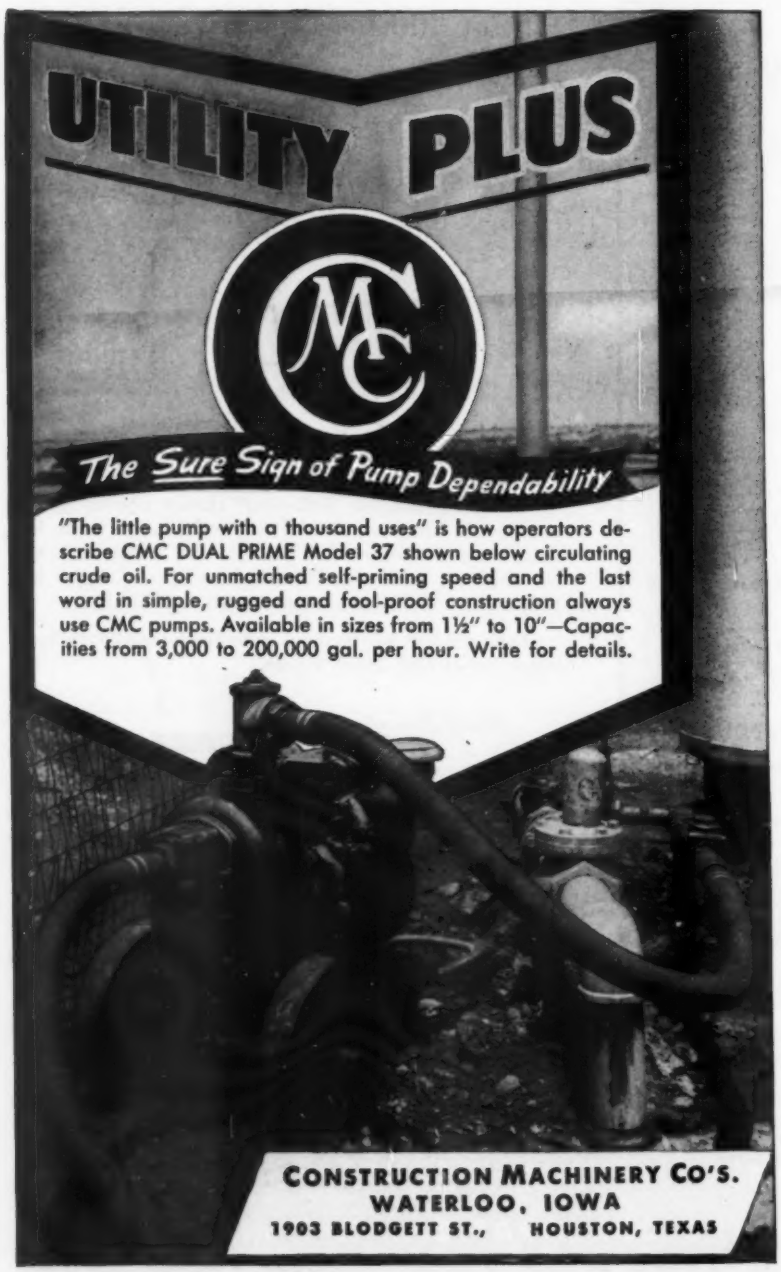
Denton County: J. Constantin and W. H. Rogers, Jr. 1 J. L. Snellgrove, BBB&C Sur., A-184, 2 mi. SE Bolivar, dry, TD 2,400 ft.

E. B. Fletcher 1 Chas. Saunders, J. B. Reed Sur., A-1086, 1 mi. SE Bolivar, dry, TD 1,907 ft.

Ernest Fletcher 1 Ray L. Smith, H. C. Bernard Sur., A-74, 1 mi. W Krum, dry, TD 1,903 ft.

Marion County: Olen C. Billingsly, Jr. 1 F. W. Dake, Blk. 30, M. H. Ussery Sur., 10½ mi. W Jefferson, dry, TD 3,710 ft., elev. 210 ft.

Titus County: Peveto, Byars & Stephens 1 Mrs. Emma Brownlee, R. W. Pittman Sur., 8 mi. E Talco, dry, TD 4,505 ft., elev. 335 ft., Pecan 1,778 ft., Blossom 2,517 ft., Eagleford 3,162 ft., Comanche 3,572 ft., Fort Worth 3,866 ft., Duck Creek 4,105 ft., Goodland 4,326 ft., Paluxy 4,325 ft.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PERMIAN BASIN

Clear Fork Production Extended in Flanagan

MIDLAND.—Clear Fork production was extended about 1 mile east of the Flanagan multiple-pay field of southern Gaines County, at Shell Oil Co. 2 Selma E. Andrews, NE SE 2-A23-PSL. The well produced 156 bbl. of oil in 11 hours, swabbing and flowing, from 4 ft. of pay from casing set at 7,214 ft. and 7,218 ft., total depth.

The Texas Co. 1 L. Taliaferro, southwest offset to its 1 T. E. Jenkins, discovery and only producer in Jenkins Devonian field of southwest Gaines County, recovered 210 ft. of heavily oil and gas-cut mud on a 2½-hour drill-stem test from 7,139-82 ft. The 1 Taliaferro was drilling ahead at last report. Location is NE NE 6-A-25-PSL.

Four miles south of the Jenkins well, Stanolind Oil & Gas Co. 1 Nick Alley, SE NE 22-A27-PSL, 1 mile southeast of Boydell, had reached 10,847 ft. in Ordovician lime and shale.

Barnsdall Oil Co. 1 R. L. Spires, Kent County reef discovery in 22-4-H&GN, 8 miles southwest of Clairemont, acidized with 1,500 gal. through perforations at 6,755-71 ft. and flowed 200 bbl. of oil in 12 hours through ½-in. choke. Tubing pressure was 200 psi. and gas-oil ratio was 584 cu. ft. The well was given a calculated daily potential of 400 bbl. of 42°-gravity oil, and was shut in to erect a tank battery.

New explorations for Kent County included Roeser & Pendleton, Inc. 1 Ida Montgomery, located 1,213 ft. from west and 2,170 ft. from north lines, 78-98-H&TC, which is about 1½ miles southwest of Jayton and 9½ miles northeast of Clairemont. Company tools will be used on the 7,500-ft. project.

Blanco Oil Co. and others staked location for a 7,700-ft. wildcat 11 miles northwest of Clairemont, as the 1 Girard Trust Co., SW SW 40-1-H&GN. Location is 5½ miles north and slightly west of Caroline Hunt Trust 1 Young, reef discovery.

Nelson Bunker Hunt 1 Mary Couts Burnett Trust, Section 3, D. R. Stout Survey, west offset to the 1 Young discovery, topped the reef at minus 4,123 ft., which was about flat to the discovery. A core from 6,220-42 ft. recovered 16 ft. of lime with good porosity and saturation.

South of the 1 Young, Caroline Hunt 2 J. W. Young, Section 145, topped the reef at minus 4,131 ft. and was drilling ahead at 6,267 ft.

In Scurry County, Esperado Mining Co. 1 T. J. McDonald, 336-97-H&TC, 1¾ miles northeast of nearest production in the North Snyder field, was trying to free stuck drill pipe. Top on the reef was reported at 6,748 ft., or minus 4,227 ft.

One mile north of production in Kelley Canyon field, Wilshire Oil Co. 1 Wren, 292-97-H&TC, had top of the reef at 6,740 ft., minus 4,250 ft. It was to drill ahead to around 6,900 ft. before testing.

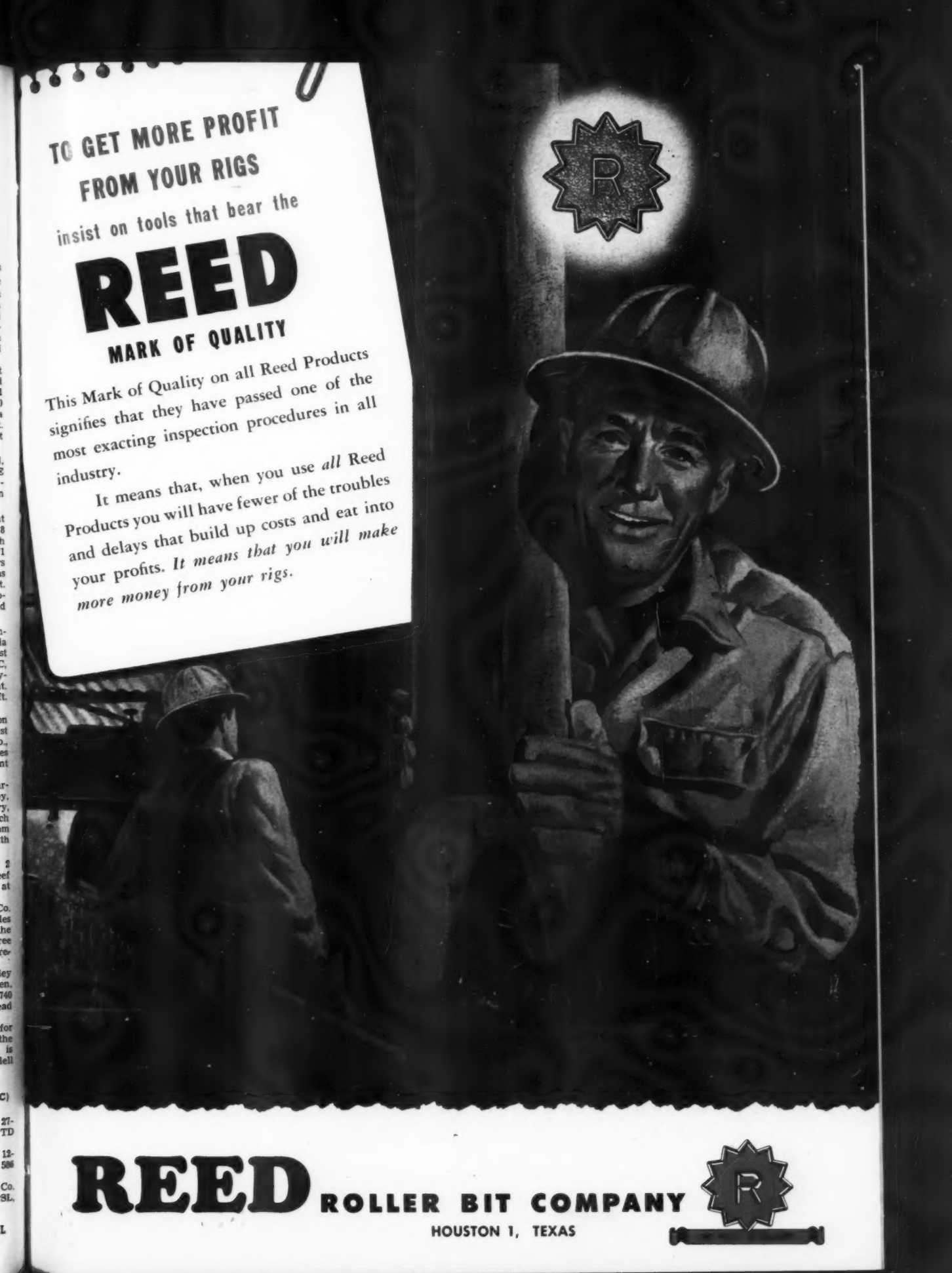
Geir-Jackson, Inc. filed application for its 1 Feldman-Pardo, 467 ft. out of the southeast corner of 703-97-H&TC, which is between the Feldman-Pardo and Cogdell producing areas.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Crockett County: C. W. Brown 1 Bean, 27-UV-GC&SF, 15 mi. NW Ozona, dry, TD 1,512 ft., elev. 2,569 ft.

Sam Henderson 1 George Harrel Est., 12-L-GC&SF, 20 mi. S Ozona, dry, TD 586 ft.

Gaines County: Humble Oil & Refining Co. 1 James W. Dines, SE SW 9-A10-PSL,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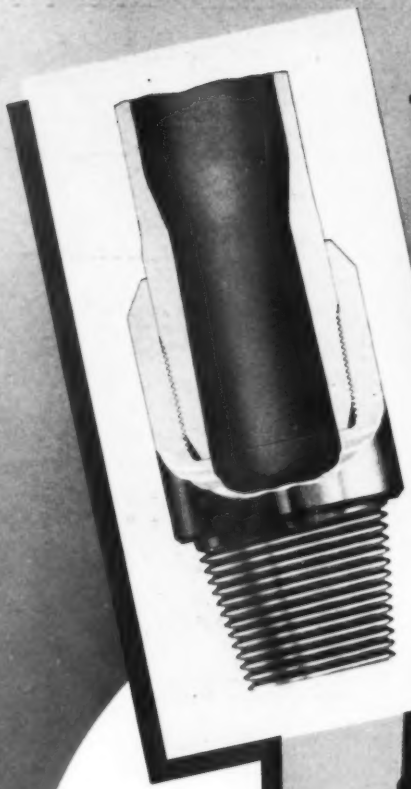

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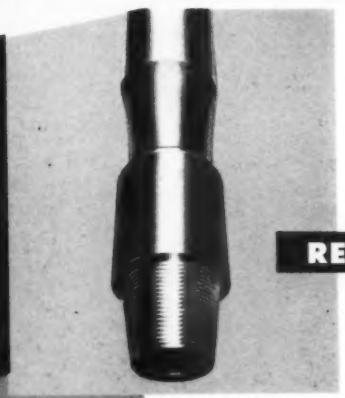

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1 mi. SE E. Hobbs Glorietta discovery, dry, TD 6,809 ft., elev. 3,573 ft., Yates 3,140 ft., San Angelo 5,965 ft., Clear Fork 6,560 ft.

Irion County: C. Reynolds 1 W. M. Noelke Est., Sec. 1,228, GC&SF Sur., NE of Clear Fork discovery, dry, TD 1,308 ft.

King County: John R. Less and Stekoll Petroleum Co. 1 D. E. Richards, SW SE Sec. 11, BS&F Sur., 12 mi. N Guthrie, dry, TD 6,010 ft., elev. 1,907 ft., reef 4,627 ft., DST 5,090-5,125 ft. in Strawn had sulfur water.

Pecos County: M. O. Rife, Jr. 1 W. C. Tyrell, Sec. 509, Garcia, Montez & Duran

(Continued on page 145)

KANSAS

Testing Gets Under Way in Hodgeman County Wildcat

TESTING is getting under way at Shell Oil Co. 1 Springer, SE SW SW 24-22-24, prospective discovery well in Hodgeman County, in the central western part of the state. With casing perforated at 4,600-16 ft. in the Mississippian, topped at 4,594 ft. (—2,211 ft.), the hole filled 800 ft. with oil in the first 3½ hours. Since then, the pay zone has been acidizied and swabbing started.

The well has given promise of production both in the upper Mississippian and the overlying Sooy conglomerate section (basal Pennsylvanian), topped at 4,569 ft. (—2,186 ft.). The latter zone will be tested separately. Hole was drilled to 5,148 ft. in the Arbuckle, topped at 5,073 ft., but no showings of consequence were reported below the upper Mississippian.

If this well proves commercially productive it will be the first for the county, which lies in that large open region between the Central Kansas Uplift and the Hugoton gas field, 50 miles to the west. Nearest production is in the Manteno pool, 25 miles to the northwest in Ness County.

Opening another pool in the active Morel area, southeastern Graham County, Aurora Gasoline Co. and associates 1 Walker, NE NE NE 16-9-22, swabbed at rate of 22 bbl. of oil per hour while testing Arbuckle lime after a 500-gal. acid treatment. Prior to acidizing, the well tested only 1 bbl. of oil per hour. Hole is open at 3,960-62 ft. Arbuckle was topped at 3,946 ft. (—1,619 ft.). The location is about 4 miles northwest of the West Morel pool.

Peel & Hardman 1 DeSair, SE SE SE 26-9-22, 3 miles southwest of the West Morel pool, failed to find any showings in the Aruckle, drilled to 3,977 ft., and will be tested in the Lansing-Kansas City lime, in which drill-stem tests have given indications of production. Casing was run to 3,832 ft., and will be perforated opposite the indicated pay zones. Lansing was cut at 3,580 ft. (—1,220 ft.). Best drill-stem test was of an interval at 3,630-42 ft., from which 200 ft. of clean oil and 115 ft. of oil-cut mud was recovered.

Westgate-Greenland Oil Co. has completed its 1 Smith, NE NE NW 5-10-21, discovery well of the Smith-Denning pool, 3 miles southwest of the Morel pool, with a potential of 1,981 bbl. of oil per day. Its pay zone is the Arbuckle, cut at 3,816 ft. (1,556 ft.), and open at 3,818-22 ft.

In Barton County, Lewis Drilling Co. is proving another new productive area at its 1 Dietz, SW SW NW 9-17-14, about 2 miles north of the Carroll pool. The well got water in the Arbuckle lime, but plugged back to the Lansing-Kansas City lime, where it is making a well. From casing perforations at 3,230-40 ft., it swabbed 4 bbl. of oil per hour for 8 hours. Pay had been given a 3,000-gal. acid treatment. Top of the Lansing is 3,223 ft. (—1,244 ft.). Arbuckle was logged at 3,494-96 ft.

A new Viola lime pool is in prospect in eastern Marion County where Raymond Gear and associates are testing their 1 Robinson, SW SW NE 31-20-5e. Viola was topped at 2,561 ft. (—1,158 ft.) and drilled to 2,566 ft. The well is estimated good for about 25 bbl. of net oil (34° gravity) with about 10 bbl. of water per day. Nearest production is in the Florence pool, 2 miles to the south.

KANSAS SUCCESSFUL WILDCATS

Barton County: Adair 1 Hammeke, NW NW NW 17-19s-11w, flowed 1,553 bbl. of oil per day from Lansing topped at 3,065 ft., TD 3,410 ft.

Lyon County: Stanolind Oil & Gas Co. et al., 1 Cornwell, NE NE NE 26-16s-10e, pumped 257 bbl. of oil per day from Hunton topped at 2,950 ft., TD 2,967 ft.

Rooks County: Francis Oil & Gas et al., 1 Pywell, SW SW SW 31-9s-19w, pumped 133 bbl. of oil per day from Arbuckle topped at 3,768 ft., TD 3,780 ft.

Heathman Drilling 1 Williams, NW NW NW 16-10s-20w, pumped 352 bbl. of oil per day from Arbuckle topped at 3,813 ft., TD 3,821 ft.

Stafford County: Phillips and Hanson 1 Fischer, SE SW NW 6-21s-11w, pumped 202 bbl. of oil per day from Arbuckle topped at 3,424 ft., TD 3,461 ft.

KANSAS WILDCAT FAILURES

Barton County: Bay Petroleum 1 Johnston, NW NW SE 8-17s-13w, dry, TD 3,468 ft., anhydrite 870 ft., Topeka 2,781 ft., Heebner 3,088 ft., Lansing 3,183 ft., conglomerate 3,424 ft., Arbuckle 3,431 ft.

Aladdin et al., 1 Isern, SW SW NW 19-19s-11w, dry, TD 3,405 ft., anhydrite 600 ft., Topeka 2,700 ft., Heebner 2,960 ft., Lansing 3,099 ft., conglomerate 3,354 ft., Arbuckle 3,388 ft.

Ellsworth County: Veeder Supply 1 Schepmann, SW SW SW 14-17s-10w, dry, TD 3,309 ft., Lansing 2,945 ft., Arbuckle 3,289 ft.

Graham County: Nye 1 Jenkins, NW NW NW 33-6s-21w, dry, TD 3,781 ft., anhydrite 1,840 ft., Heebner 3,425 ft., Lansing 3,467 ft., Arbuckle 3,729 ft.

Coppinger et al., 1 Hale, NW SW SW 11-7s-23w, dry, TD 4,060 ft., Topeka

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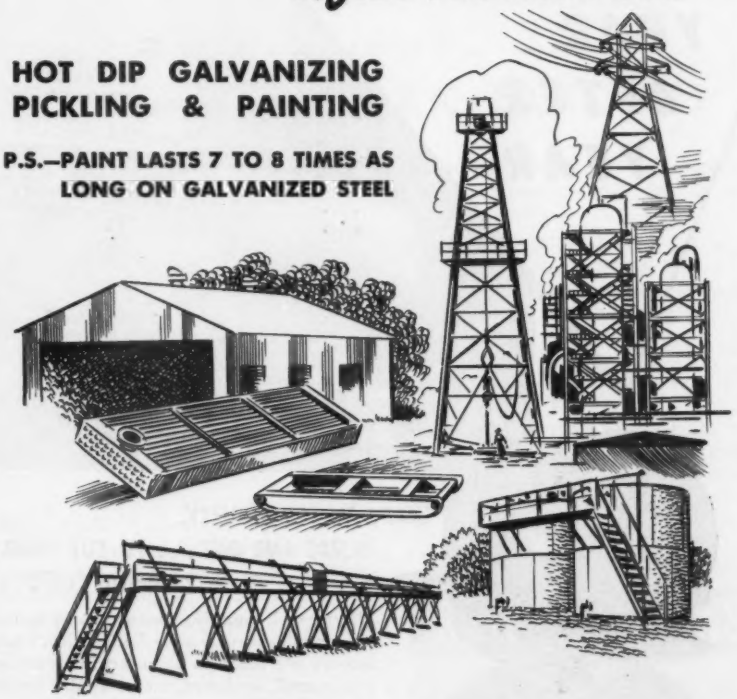

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Rine Drilling 1 Berland, SW SW SW 13-8s-21w, dry, TD 3,719 ft., anhydrite 1,613 ft., Heebner 3,246 ft., Lansing 3,328 ft., Arbuckle 3,673 ft.

Kingman County: Anschutz Drilling 1 Simons, NW NW SE 26-27s-5w, dry, TD 4,335 ft., Lansing 2,955 ft., Mississippian 3,767 ft., Viola 4,174 ft., Simpson 4,184 ft., Arbuckle 4,298 ft.

Lincoln County: Harbar Drilling 1 Rassmussen, NW NE NE 29-10s-9w, dry, TD 3,933 ft., Topeka 2,538 ft., Lansing 2,725 ft., Mississippian 3,284 ft., Hunton 3,494 ft., Viola 3,697 ft., Simpson 3,858 ft., Arbuckle 3,883 ft.

Lyon County: Susmio Oil Co. 1 Owen, SW NW NE 30-20s-10e, dry, TD 2,451 ft., Kansas City 1,382 ft., Martlesville 2,305 ft., Mississippian 2,448 ft.

Marshall County: Davon Drilling 1 Schaefer, NW NW SW 20-1s-6e, dry, TD 2,715 ft., Hunton 1,687 ft., Viola 2,148 ft., Simpson 2,515 ft., St. Peter 2,643 ft., granite 2,686 ft.

Morris County: Wakefield and Stanolind Oil & Gas 1 Dent, SE NE NE 26-16s-9e, dry, TD 3,160 ft., Topeka 828 ft., Lansing 1,367 ft., Kansas City 1,488 ft., Mississippian 2,458 ft., Hunton 2,835 ft., Viola 2,953 ft., Simpson 3,033 ft., with slight show of oil, Arbuckle 3,115 ft.

Rice County: Dozier et al., 1 Burfield, SW SW SW 3-19s-8w, dry, TD 3,510 ft., Topeka 2,446 ft., Heebner 2,726 ft., Lansing 2,885 ft., conglomerate 3,310 ft., Viola 3,393 ft., Simpson 3,444 ft., Arbuckle 3,494 ft.

Helmerich & Payne et al., 1 Harp, NW NW SE 24-21s-10w, dry, TD 3,574 ft., in Arbuckle, Topeka 2,555 ft., Heebner 2,844 ft., Lansing 2,993 ft., conglomerate 3,350 ft., Simpson 3,374 ft., Arbuckle 3,574 ft.

Rooks County: Nadel & Gussman 1 Baldwin "B," NE NE NE 20-9s-20w, dry, TD 3,940 ft., anhydrite 1,810 ft., Topeka 3,350 ft., Heebner 3,550 ft., Lansing 3,596 ft., conglomerate 3,908 ft.

Krueger Bros. 1 Ekey, SE NW NE 19-10s-16w, dry, TD 3,707 ft., anhydrite 1,298 ft., Topeka 3,023 ft., Heebner 3,255 ft., Lansing 3,296 ft., conglomerate 3,617 ft., Arbuckle 3,661 ft.

Sedgwick County: Uhl 1 Meyersick, NW NW SE 36-25s-2e, dry, TD 3,375 ft., Lansing 2,115 ft., Kansas City 2,394 ft., Mississippian 2,831 ft., Hunton 3,204 ft., Viola 3,239 ft., Simpson 3,267 ft., with slight show of oil, Arbuckle 3,354 ft.

Sumner County: Deep Rock 1 Schwartz, NW SW NW 29-34s-4w, dry, TD 5,095 ft., Kansas City 3,730 ft., Mississippian 4,396 ft., Simpson 4,852 ft., Arbuckle 5,065 ft.

Wabaunsee County: Sterling Drilling 1 Hoch, SW SW SW 21-14s-10e, dry, TD 3,472 ft., Topeka 1,051 ft., Lansing 1,646 ft., Kansas City 1,797 ft., Mississippi lime 2,613 ft., Hunton 3,076 ft., Viola 3,283 ft., Simpson 3,362 ft., Arbuckle 3,460 ft.

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Richland County Wildcat Uncovers McClosky Pool

FLOYD L. RUNYON 1 Olcese, a wildcat located in the NE NW NW 4-2n-10e, 3 miles east of Calhoun, Richland County, Illinois, is being completed on the pump following a swabbing test in which it produced 370 bbl. in 13 hours. Production is from McClosky lime at 3,184-88 ft. with hole open below 3,175 ft. to total depth of 3,189 ft. Prior to the swabbing test, the pay zone was given a 3,000-gal. acid treatment. The location is about a mile from nearest production in the area between the Calhoun and North Calhoun pools. On the pump the well is estimated good for from 250 to 275 bbl. daily.

Two townships north, same county, in the area north of the Olney pool and east of Clay City-Noble production, Nation Oil Co. and associates appear to have made a Rosiclare discovery at their 1 Kermicle, SE SE NW 4-4n-10e. Located more than a mile from nearest production, the well yielded 100 ft. of clean oil and 30 ft. of oil-cut mud in a drill-stem test of this formation at a total depth of 2,911 ft. Casing has been cemented on bottom and will be perforated opposite the prospective pay zone for completion.

Aurora Gasoline Co. and associates 1 Jackson, NE SW SE 10-6s-13w, Posey County, Indiana, has been completed as the discovery well of the Oliver South pool. Producing from the Aux Vases zone at 2,779-84 ft., the well made 170 bbl. of oil in 24 hours at completion. Pay had been treated with 2,000 gal. of acid. The discovery is located west of the old Oliver gas area, 6 miles north of Mt. Vernon, and about 2 miles from nearest oil production, this being in the Caborn West pool to the southeast.

C. E. Skiles' prospective discovery well, 1 Aldridge, NW NE SW 34-6s-14w, 5 miles northwest of Mt. Vernon and about 7 miles southwest of Aurora's new pool, same county, swabbed at the rate of 2 bbl. of oil per hour following a 20-qt. shot, and is being put on the pump. Its pay zone is the Benoist sand at 2,483-2,505 ft. This well is about 2 miles northwest of production of the Mt. Vernon pool. A confirmation test, 2 Hagerman, NW NW SW 34, ¼ mile west of 1 Aldridge, is showing for production with pay zone at 2,482-93 ft.

Another major extension of the recently opened Oskaloosa pool, south of Iola, western Clay County, is in prospect at F. B. Drilling Co. 1 Harrell, 3-3n-5e, where testing of the pool's Benoist sand pay zone is getting under way. The sand was logged at 2,668-80 ft. A drill-stem test, taking in an interval from 2,665 ft. to bottom (still in

the sand), yielded 350 ft. of clean oil with about 70 ft. of mud and fresh water. The well is about ¾ mile southwest of the pool's discovery well (The Texas Co. 1 Galbert). Previously, production had been extended about ¾ mile to the northwest by The Texas Co. 1 Harrell. An additional well is in prospect at The Texas Co. 1 Gammon, NE SW NE 34-4n-5e, ¼ mile south of 1 Harrell, where pumping equipment is being installed following swabbing tests in which the well produced 8 bbl. of oil per hour. Pay zone in the latter well is at 2,589-2,612 ft.

Oil Management, Inc., is extending production of the Walpole pool, 5 miles southwest of Rural Hill, Hamilton County, Illinois, about ¾ mile to the southwest its 1 Howard, SE SE NE 4-7s-6e. In a 60-minute drill-stem test of Aux Vases sand at 3,185-95 ft., the well got a good showing of gas and yielded 840 ft. of clean oil, along with 660 ft. of water. Indicated bottom-hole pressure was 1,300 psi. Oil string was run to 3,182 ft.

About ¾ mile north of production of the East Maple Grove pool, Edwards County, Illinois, J. W. Rudy 1 Hayner, SE NW SW 1-1n-10e, is testing McClosky lime at 3,201-05 ft., in which a drill-stem test yielded 360 ft. of clean oil with 20 ft. of salt water.

ILLINOIS WILDCAT FAILURES

Clay County: C. T. Smith 1 Dale, SW SW NW 15-3n-6e, dry, TD 3,063 ft.

Superior Oil Co. 1 Rickel, SW SW SE 6-3n-5e, dry, TD 2,828 ft.

Hamilton County: L. A. Schumacher 1 Hogan, SE SW NE 32-6s-6e, dry, TD 3,480 ft.

Lawrence County: C. E. Poorman 1 Gognat, NW SW NW 28-2n-12w, dry, TD 1,719 ft.

Macoupin County: D. E. Lambert 1 Paul, SE SE SW 12-9n-7w, dry, TD 565 ft.

Madison County: Joe Kesl 1 Anschultz-Schlecht, NW NW SW 29-6n-6w, dry, TD 687 ft.

Clinton County: E. A. Obering 1 Hempen, NE NE SW 18-3n-2w, dry, TD 1,274 ft.

Richland County: D. Shendall 1 Jennings, SE SW NW 15-3n-10e, dry, TD 3,252 ft.

Wabash County: G. W. Miller 1 Risley, NE NW SW 15-2s-13w, dry, TD 2,739 ft.

White County: Joe Resnik 1 Norris City Bank, SW NW NE 6-7s-8e, dry, TD 2,760 ft.

INDIANA SUCCESSFUL WILDCAT

Posey County: Aurora Gasoline Co. et al., 1 W. Jackson, NE SW SE 10-6s-13w, IP 170 bbl., Aux Vases 2,779-84 ft., TD 2,800 ft. (Opens Oliver South pool.)

INDIANA WILDCAT FAILURES

Daviess County: B. L. S. Drilling Co. 1 Dove, SE NE SW 15-5n-6w, dry, TD 717 ft.

H. B. Turner 1 Slinkard, NW SE SW 16-4n-7w, dry, TD 1,035 ft.

Gibson County: J. B. Buchman 1 R. Carithers, NW SE SE 27-1s-10w, dry, TD 1,945 ft.

N. V. and Walter Duncan 1 Riddle, NW NE NW 29-3s-11w, dry, TD 2,700 ft.

Posey County: Ryan & Sharp 1 McFadden, SE SW SE 32-5s-14w, dry, TD 3,119 ft.

Sullivan County: Bank-Kuhn 1 Adamson et al., SE SW NW 28-9n-9w, dry, TD 2,305 ft.

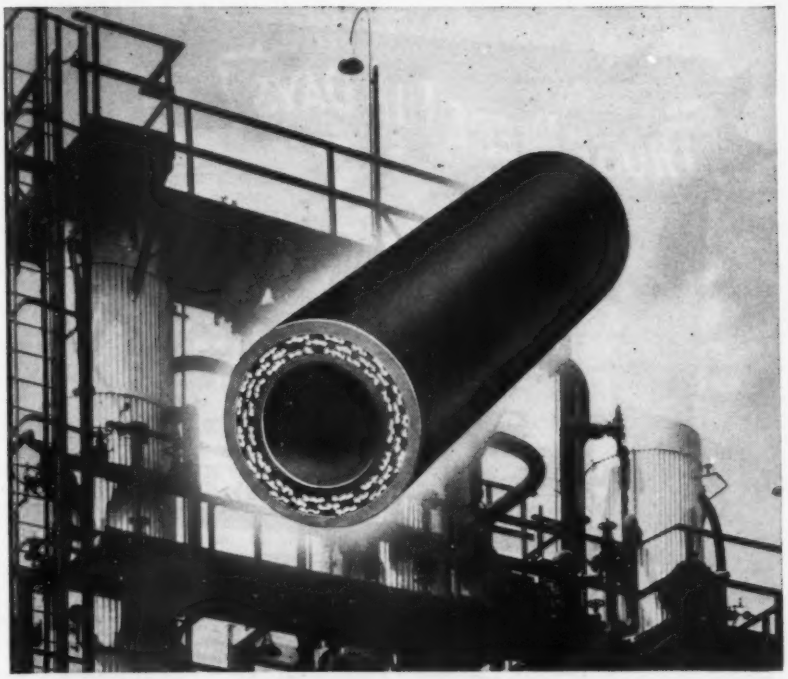
Vigo County: Carter Oil Co. 1 Pigg, NW SE SW 30-13n-7w, dry, TD 1,843 ft.

John Unger 1 Pittman, NE SW NW 35-10n-10w, dry, TD 2,376 ft.

EASTERN KENTUCKY

ASHLAND.—In Big Sandy gas field and in the Pike County sector, Columbian Fuel Gas Co. has recently completed a good gas well at 1323 J. L. Stratton. Open flow gaged 14,106,000 cu. ft. of gas daily from Maxon (Mississippian) sand at total depth of 1,623 ft. In same area Columbian also completed 1322 Charles Murray for 1,525,000 cu. ft. gas from Maxon sand at 1,677 ft. total depth.

In Carter County, 13-W-78, A. H. Carpenter is drilling below 1,500 ft. on 1 J. W. Whitt. Well will be a deep test of the St. Peter-Knox dolomite sequence. No pertinent information has been released to date on this important wildcat.



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Gas and the Public

(Continued from page 50)

form of the large beads gives low resistance to gas flow and small pressure drops. Its strength and resistance to attrition indicates no dusting to impede gas flow in long-term operation. It also is resistant to fouling by sour gases. Both pilot and plant-scale tests were described.

The problem caused by traces of mercaptans in natural gas distributed by public utilities and the necessity for the removal of this impurity were discussed by J. L. Oberseider, of Southern California Gas Co. He reported the methods for removing traces of mercaptan are the elimination of wet gas-well gas, absorption-plant operation that minimizes mercaptans in the residue gas yet maintains its heating value at a relatively high level, and desulfurization processes of the fixed-bed, straight adsorption or combined catalytic conversion and adsorption type.

The capacity calculations, and costs, of the transmission-line type of natural gas storage were given by W. C. Mosteller, Southern Counties Gas Co. of California. In the construction design of the Texas-California big-inch gas pipe line, this method provided additional storage in the form of line pack designed and built into the line. The line pack storage was built into this system at a fraction of the cost of an equivalent amount of conventional aboveground low pressure or high pressure tank holders of the type which had previously been used for daily load equation in Southern California. The pipeline storage is contained entirely within the California section between Blythe and Santa Fe Springs. The storage feature was obtained by increasing the pipe wall thickness and providing additional compressor horsepower at Blythe over and above that required for a similar line operating with uniform terminal delivery rates.

Shell Gets New Tanker

The 28,000-ton Velutina was launched recently in England as the largest vessel to join the Shell fleet and the largest tanker thus far built in Britain.

The 643-ft. tanker will carry crude oil from the Middle East to Shell's refineries in the United Kingdom. With an average speed of 16 knots and a cargo capacity of 26,000 tons, the Velutina will be able to make eight round trips a year to Britain from the Persian Gulf bringing an annual total of 200,000 tons (about 1,400,000 bbl.) of crude oil, or 14 such trips to Britain from Mediterranean ports with a total of 360,000 tons (about 2,500,000 bbl.). Shell has three other

similar tankers under construction in England.

Wirth, Towery, Harding Get New Du Pont Positions

Ray E. Miller, director of E. I. du Pont de Nemours & Co., Inc.'s petroleum chemicals division has named Charles Wirth, III, as eastern district manager of the division. He will move from Tulsa where he was Mid-Continent district manager, to New York City.

Charles D. Towery, service representative in the Gulf Coast district, has been named to succeed Wirth at Tulsa.

Paul F. Lewis, Tulsa manager, Mid-Continent district, explosives department, American Glycerin division of du Pont, has retired and will be succeeded by Richard S. Harding, formerly assistant manager of the district.

Following graduation from Tulane with an M.S. degree in organic chemistry, Wirth served with Gulf Oil Corp. and Universal Oil Products Co. prior to joining du Pont's petroleum chemicals division. Towery is a graduate of Texas A. & M. College and worked for Gulf Oil and Pure Oil Co. prior to joining du Pont. Harding joined du Pont in 1930 as a chemist and since 1933, he has [illegible] various positions in explosives sales work in the Tulsa area.

Permian Basin

(Continued from page 141)

Sur., 10 mi. N Fort Stockton, dry, TD 3,006 ft., elev. 2,749 ft., Yates 2,880 ft.

Runnels County: Continental Oil Co. 1 J. M. Barnhill, 82-acre tract, Lot 23, T. M. Fowler Sur. 440, 8 mi. SW Winters, dry, TD 4,974 ft., elev. 1,821 ft., Palo Pinto 3,825 ft., Canyon lime 3,670 ft., Strawn 3,026 ft., Capps 4,049 ft., Caddo 4,688 ft., Ellenburger 4,850 ft.

Delaware Drillers, Inc. 1 J. D. Crockett, Sec. 441, L. Martin Sur., 6 mi. SW Winters, dry, TD 4,882 ft., elev. 1,856 ft., Saddle Creek 2,485 ft., Palo Pinto 3,916 ft., Capps 4,160 ft., Fry 4,275 ft.

William Hamm, Jr. and Fred M. Manning, Inc. 1 John Norman, G. Berry Sur., 1½ mi. N Murray-Stevens field, dry, TD 4,592 ft., elev. 2,009 ft., Capps 4,362 ft., sand 4,401 ft., lower Fry sand 4,474 ft.

Tom Green County: Miles Production Co. 1 S. L. Shaw, F. Schmidt Sur. 890, 10 mi. W. Susan Peak field, 4 mi. N Christoval, dry, TD 5,512 ft., elev. 1,896 ft., Palo Pinto 4,470 ft., Strawn 4,960 ft., lime 5,216 ft.

SOUTHEAST NEW MEXICO

HOBBS.—Union Oil Co. of California was ready to complete its 1 Kyte, San Andres discovery in east central Lea County, in NW NW SW 5-20s-39e, 10 miles southeast of Hobbs and near the west line of Gaines County, Texas.

The well had flowed up to around 60 bbl. of oil a day from pay at 4,350-4,410 ft., and following a shot with nitroglycerin and acid treatment, it was swabbed and flowed for 3 bbl. of oil an hour. Operators planned to install pumping equipment. Total depth was 7,738 ft., in the Wichita-Albany section of the lower Permian, then plugged back to 4,410 ft.

Stanolind Oil & Gas Co. 2-A Foster, short west extension to Drinkard sand production in House field, kicked off after swabbing the pay section from 7,455-7,607 ft., total depth, and flowed 123 bbl. of oil in 6 hours through ¾-in. tubing choke. The oil was cut about 10 per cent with basic sediment and drilling water and the well was flowing to clean before running completion tests. Location is NE SW 23-19s-38e.

A new wildcat for Chaves County, 20 miles northeast of Roswell, was staked and had drilling under way last week. The project is Earl Levick 1 State, a shallow test in NW NE 7-8s-27e.

SOUTHEAST NEW MEXICO SUCCESSFUL WILDCAT

Eddy County: Leonard Oil Co. 1 Keohane-Federal, SW SW SW 6-19s-30e, 2 mi. E Turkey Track field, TD 2,250 ft., PB 2,244 ft., elev. 3,388 ft., pay 2,228 ft., pumped 30 bbl. of oil a day.

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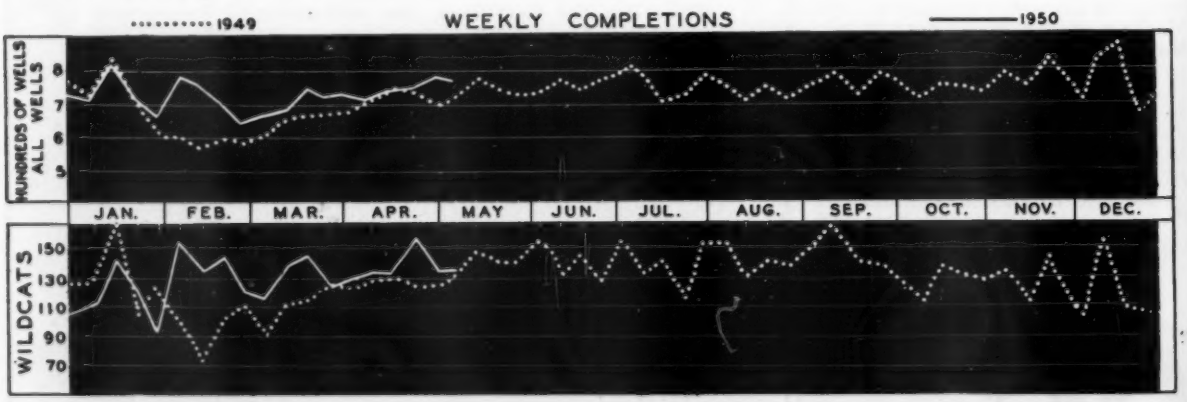
CURRENT STATISTICS

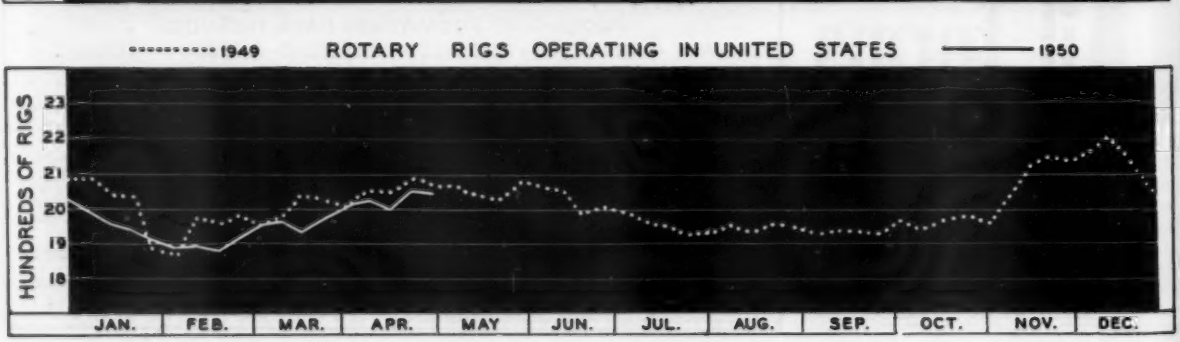
EXPLORATION

WEEKLY WELL COMPLETIONS . . . . . WEEK ENDED MAY 6, 1950

	Total of all wells					May 6		Wildcat completions and discoveries									
													Cumulative total, 1950				
	Comp.	Oil	Gas	Dry	Footage	1950	1949	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	7	4	0	*3	8,430	160	473	0	0	0	0	0	0	0	0	0	0
Pennsylvania	14	5	4	†5	25,670	361	746	0	0	0	0	0	0	0	0	0	0
West Virginia	16	4	12	0	49,483	207	174	0	0	3	0	3	0	0	7	8	15
Ohio	18	5	5	8	41,174	307	386	0	0	0	1	1	1	0	1	6	8
Indiana	37	18	0	19	63,360	378	380	1	0	0	8	9	10	0	1	65	76
Kentucky	21	11	4	6	41,025	290	285	0	0	0	0	0	6	0	1	22	29
Illinois	50	24	0	26	116,846	739	704	0	0	0	10	10	11	0	0	179	190
Michigan	19	10	0	9	37,714	230	299	0	0	0	4	4	11	0	3	90	104
Kansas	74	36	6	32	243,343	1,198	990	5	0	0	18	23	28	0	2	181	211
Nebraska	0	0	0	0	0	21	11	0	0	0	0	0	0	0	1	11	12
Oklahoma	111	72	3	‡36	358,420	1,742	1,372	4	2	1	11	18	49	5	8	222	284
Texas	285	184	13	88	1,174,704	5,228	4,496	3	1	2	37	43	158	12	41	827	1,038
North Central (Dist. 7-B & 9)	69	34	2	33	203,530	1,631	1,451	2	0	0	10	12	56	2	11	300	369
West (Dist. 7-C & 8)	89	71	1	17	422,853	1,531	982	0	0	0	10	10	40	1	0	173	214
Panhandle (Dist. 10)	16	9	6	1	49,072	340	339	0	0	0	0	0	1	0	2	8	11
Eastern (Dist. 5, 6, & 6-P)	27	22	0	5	104,811	369	335	0	0	0	5	5	5	1	1	80	87
Gulf Coast (Dist. 2 & 3)	48	25	1	22	232,498	712	650	1	1	1	7	10	29	4	14	109	156
Southwest (Dist. 1 & 4)	36	23	3	10	161,940	645	739	0	0	1	5	6	27	4	13	157	201
Louisiana	44	35	3	6	292,577	788	686	0	0	0	2	2	22	6	4	65	97
Northern	23	18	3	2	85,954	412	348	0	0	0	0	0	4	0	1	27	32
Southern	21	17	0	4	206,623	376	338	0	0	0	2	2	18	6	3	38	65
Arkansas	3	2	0	1	9,609	118	97	0	0	0	0	0	1	0	0	28	29
Mississippi	6	2	1	3	40,880	112	125	1	0	0	1	2	7	1	0	39	47
Southeastern States	0	0	0	0	0	21	19	0	0	0	0	0	0	0	1	14	15
Montana	1	0	0	1	3,487	48	68	0	0	0	0	0	0	0	0	9	9
Wyoming	9	7	0	2	30,202	186	190	1	0	0	0	1	6	0	0	22	28
Colorado-Utah	1	0	0	1	1,058	20	36	0	0	0	1	1	0	0	0	17	17
New Mexico	15	12	1	2	86,027	223	198	1	0	0	1	2	8	0	0	19	27
California	35	17	0	18	164,526	586	917	0	0	0	15	15	9	0	2	119	130
Miscellaneous	0	0	0	0	0	6	13	0	0	0	0	0	0	0	0	6	6
Total United States	766	448	52	266	2,788,535	12,969	12,665	16	3	6	109	134	327	24	72	1,949	2,372
Total previous week	786	476	48	262	2,968,136	....	....	16	1	1	116	134	311	21	66	1,840	2,238
Total May 7, 1949	781	445	48	288	3,324,187	....	....	15	3	5	111	134	307	28	61	1,763	2,159

Service wells included: *3. †4, ‡1.





DAILY AVERAGE PRODUCTION FOR WEEK

	May 6 crude oil	B. of M. May demand	Apr. 29 crude oil
Alabama	1,450	1,900	1,450
Arkansas	80,600	86,000	80,300
California	856,400	845,000	857,600
Colorado	58,950	63,000	58,800
Eastern	61,500	60,800	60,300
Florida	1,050	1,100	975
Illinois	176,500	182,000	179,200
Indiana	29,400	27,000	28,500
Kansas	257,150	280,000	272,900
Kentucky	26,500	25,000	26,300
Louisiana	519,575	550,000	513,450
North Louisiana	119,250	.....	118,450
South Louisiana	400,325	.....	395,000
Michigan	45,600	45,000	44,400
Mississippi	93,900	102,000	97,350
Montana	24,600	25,000	24,500
Nebraska	1,500	2,200	1,500
New Mexico	126,075	139,000	125,800
Oklahoma	404,200	425,000	423,750
Texas	2,070,500	2,090,000	1,982,850
Dist. 1 (Southwest)	27,250	.....	26,475
Dist. 2 (Southwest)	121,425	.....	118,900
Dist. 4 (Southwest)	193,525	.....	187,700
Dist. 3 (Gulf Coast)	372,500	.....	348,300
Dist. 5 (Eastern)	31,375	.....	30,550
Dist. 6 (Eastern)	82,250	.....	80,250
East Texas field	261,425	.....	258,000
Dist. 7-C (West)	50,550	.....	47,875
Dist. 8 (West)	634,775	.....	601,850
Dist. 7-B (W. Central)	66,450	.....	63,100
Dist. 9 (N. Central)	137,800	.....	130,550
Dist. 10 (Panhandle)	91,175	.....	89,300
Utah	3,350	3,000	3,000
Wyoming	164,100	147,000	160,100
Total United States	*5,002,900	5,100,000	4,943,025
Change from previous week, up	59,875		
Canada	61,685	.....	66,160

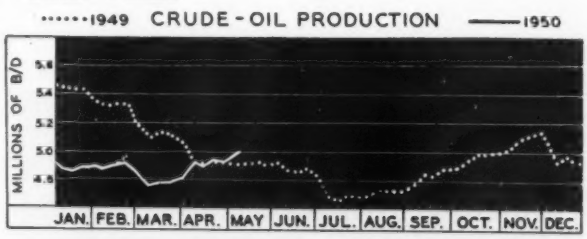
Total U. S. production January 1-May 6 ..... †625,815,855 bbl.
Same period last year (crude plus cond.) ..... 664,673,465 bbl.

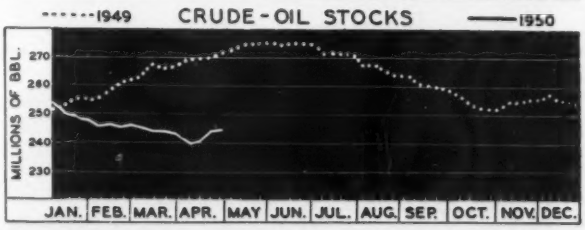
*Not incl. 103,175 bbl. condensate. †Incl. 11,933,005 bbl. condensate.

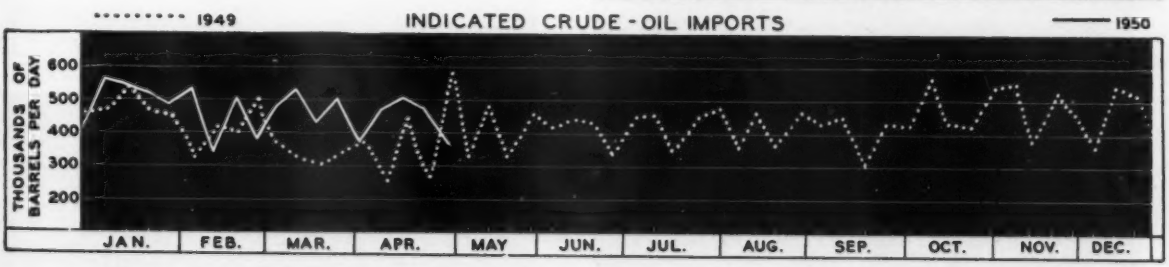
CRUDE-OIL STOCKS BY STATES OF ORIGIN*
(Thousands of barrels)

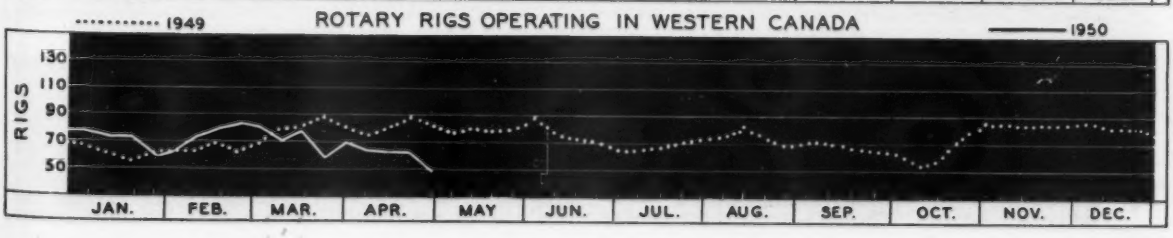
	April 29, 1950	April 22, 1950	April 30, 1949
Pennsylvania Grade	2,858	2,777	3,029
Other Appalachian	1,724	1,643	2,048
Illinois, Indiana, Michigan	9,008	9,247	14,139
Arkansas	3,057	3,009	3,177
Louisiana	15,321	15,961	13,829
North	3,405	3,434	3,334
Gulf	11,916	12,527	10,495
Mississippi	2,456	2,356	3,009
New Mexico	6,368	6,395	7,520
Oklahoma and Kansas	35,535	35,810	38,762
Texas	110,011	107,878	128,919
East Texas	15,240	14,876	18,261
West Texas	39,803	38,705	52,382
Texas Gulf	27,580	27,517	29,361
Other Texas	27,388	26,780	28,915
Rocky Mountain	13,519	13,468	13,673
California	37,423	38,128	34,429
Foreign	7,464	7,439	8,721
Total	244,744	244,111	271,255

*Bureau of Mines.









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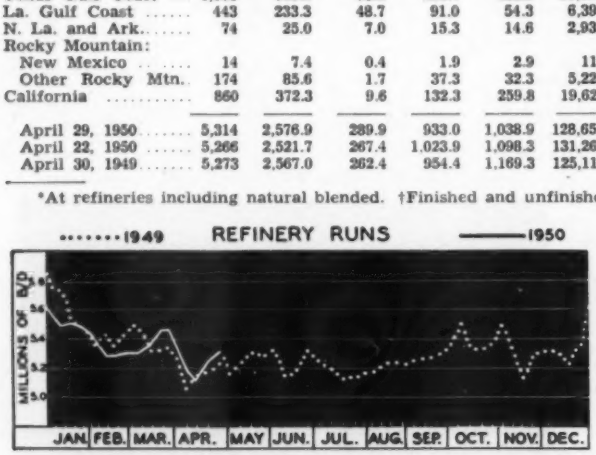
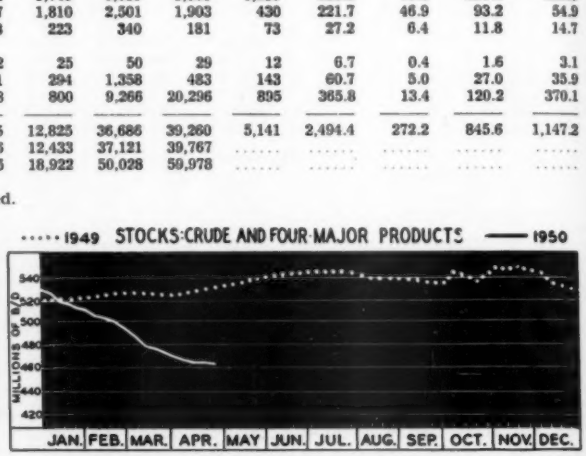
A.P.I. REFINERY REPORT, APRIL 29

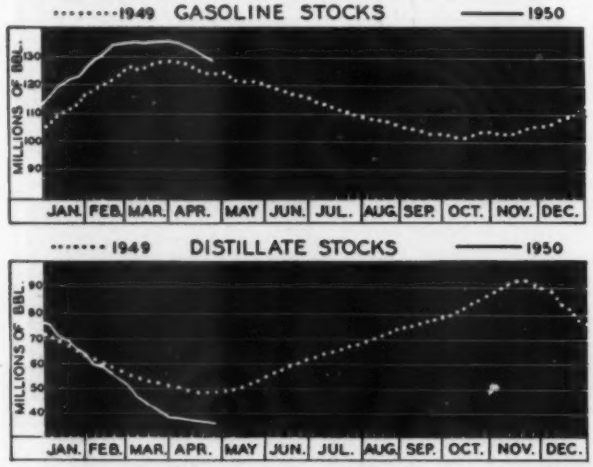
(Thousands of barrels)

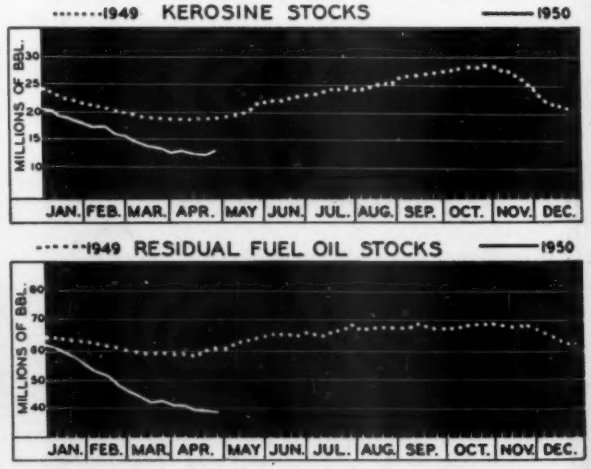
District—	Daily avg. crude runs	Daily average production				Stocks at refineries, bulk terminals, in transit and in pipe lines				Bureau of Mines, April 1949				
		Gasoline*	Kerosine	Distillate	Residual	Gasoline†	Kerosine	Distillate	Residual	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	878	352.4	27.3	183.0	186.4	25,900	4,842	9,515	9,265	736	308.3	31.3	137.5	184.5
Appalachian:														
District 1	85	36.0	6.3	12.8	10.9	2,576	263	470	231	86	39.3	4.8	10.5	8.8
District 2	71	31.1	4.7	8.9	13.1	1,039	72	91	130	67	33.9	3.6	5.8	16.2
Ind., Ill., Ky.	920	487.9	62.0	136.1	151.3	27,254	1,980	4,189	2,314	857	456.5	49.3	125.0	127.0
Okla., Kans., Mo.	429	240.3	15.7	97.0	61.3	13,778	517	2,520	787	394	214.2	22.5	78.3	64.2
Inland Texas	203	140.0	12.9	30.7	39.4	3,618	251	747	581	213	143.5	13.5	18.6	47.5
Texas Gulf Coast	1,163	565.6	93.6	186.7	212.6	20,194	1,748	5,639	3,060	1,235	616.6	75.1	216.1	220.3
La. Gulf Coast	443	233.3	48.7	91.0	54.3	6,397	1,810	2,501	1,903	430	221.7	46.9	93.2	54.9
N. La. and Ark.	74	25.0	7.0	15.3	14.6	2,938	223	340	181	73	27.2	6.4	11.8	14.7
Rocky Mountain:														
New Mexico	14	7.4	0.4	1.9	2.9	112	25	50	29	12	6.7	0.4	1.6	3.1
Other Rocky Mtn.	174	85.6	1.7	37.3	32.3	5,221	294	1,358	483	143	60.7	5.0	27.0	35.9
California	860	372.3	9.6	132.3	259.8	19,628	800	9,266	20,296	895	365.8	13.4	120.2	370.1
April 29, 1950	5,314	2,576.9	289.9	933.0	1,038.9	128,655	12,825	36,686	39,260	5,141	2,494.4	272.2	845.6	1,147.2
April 22, 1950	5,266	2,521.7	267.4	1,023.9	1,098.3	131,266	12,433	37,121	39,767	.....	.....	.....	.....	.....
April 30, 1949	5,273	2,567.0	262.4	954.4	1,169.3	125,115	18,922	50,028	59,978	.....	.....	.....	.....	.....

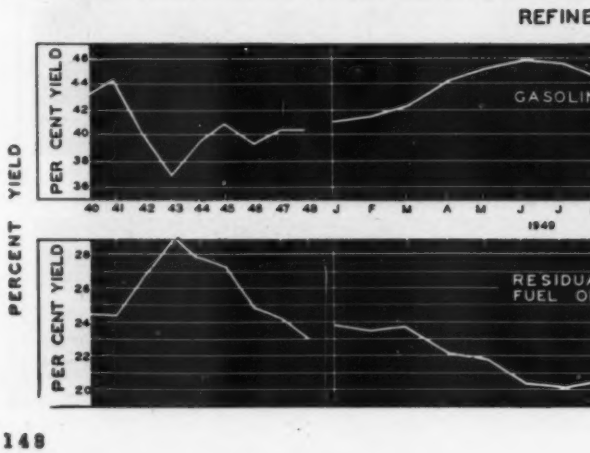
*At refineries including natural blended. †Finished and unfinished.

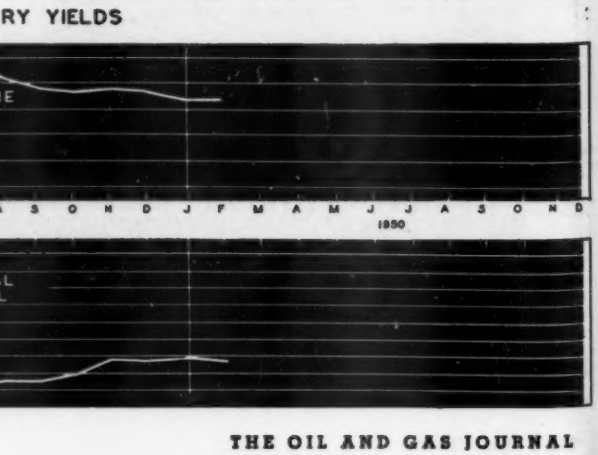












CRUDE PRICES

GRAVITY SCHEDULE

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.53	....	....	....
19-19.9	1.63	....	....	....
20-20.9	1.73	$2.25	....	$2.12
21-21.9	1.82	2.27	....	2.14
22-22.9	1.92	2.29	....	2.16
23-23.9	2.02	2.31	....	2.18
24-24.9	2.12	2.33	$2.56	2.20
25-25.9	2.22	2.35	2.58	2.22
26-26.9	2.31	2.37	2.60	2.24
27-27.9	2.37	2.39	2.62	2.26
28-28.9	2.42	2.41	2.64	2.28
29-29.9	2.48	2.43	2.66	2.30
30-30.9	2.54	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.64	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. Above changes do not include recent reductions of a few buyers applying principally to low-gravity grades.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

East Texas†	$2.65
Kettleman Hills, California*	2.77
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	3.65
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

ESSO STANDARD OIL CO. coupled an announcement of increased storage capacity on the East Coast with a statement that the company is not planning another discount program for fuel oils this summer. This, in itself, is another stabilizing factor in the heating-oil market. The fact that major oil companies are adding to storage facilities makes possible the necessary inventory increase during the summer. If resellers and consumers refuse to fill their tanks during the early summer months, the fuel will remain in primary storage, located as near as possible to points of consumption. Distillate and kerosine stocks east of California are about 22,000,000 bbl. less than at this time last year.

Crude stocks are down to normal working levels with no talk of crude price cuts. All of these point to firmer heating oil prices for this summer.

Very little residual fuel is reported available on the open market in the New York Harbor area and a greater percentage of the Gulf movement is at the "high" of the market.

Most kerosine and distillate sales are to regular customers with very little activity on the spot market. Suppliers expect a normal increase in middle-distillate inventories in May.

Gasoline prices in the Mid-Continent area are strong, with demand unusually good at the start of the motor-fuel season. Major reductions in total gasoline stocks since early in April have reduced inventories east of California to last year's level.

As a result, more refiners are taking advantage of the price differential between motor fuel and natural gasoline and buying more natural. Purchases of natural in February were reduced when many refiners believed that motor-fuel inventories were too high.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of May 8, 1950. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	9¾-10	11.5-11.9	10-10½
Premium gasoline, 86-88 octane	10½-11	12.5-12.9	10½-11
42-44 w.w. kerosine	8½-8¾	8.8	7¾-8¼
No. 2 straw fuel oil	7⅝-7¾	7.6	6⅝-7
No. 6 residual	$1.60-1.65	$2.05	$1.65-1.75

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	4¾	4¼	4½
Grade 18-55	5.7	5.2	5.45

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	10.5
750 vis., No. 3-4 neutral	12.75
2,000 No. 5-6 neutral	14-14.5

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	17
200 vis., No. 3 neutral, 0-10 pp.	11.5-12.5

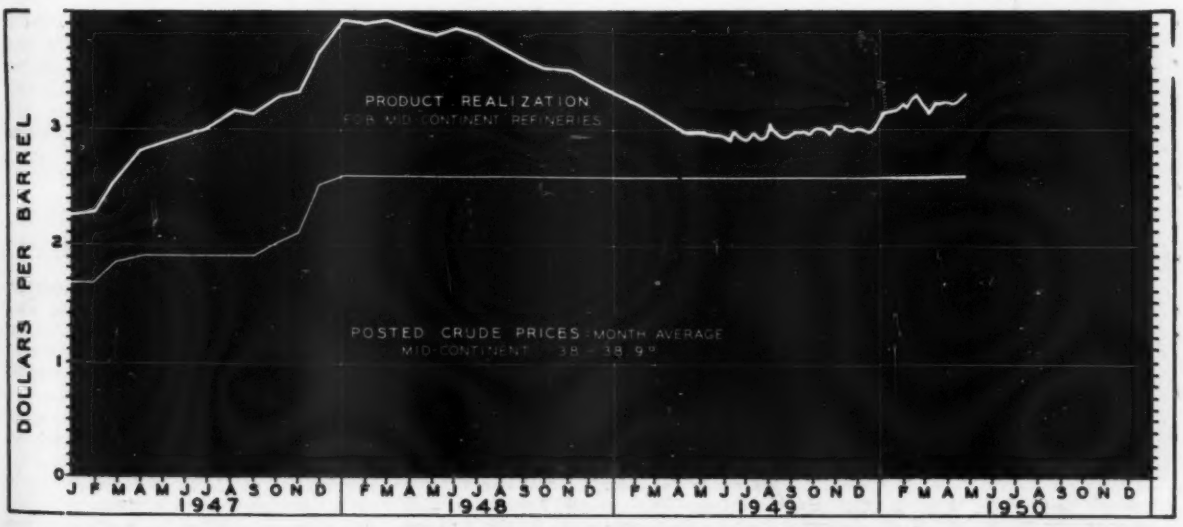
Western Pennsylvania

145-155 vis., 10 p.t. bright stock	19
180 vis., 0 p.t. neutral	20-20.5

WAX

Mid-Continent

132-134 A.M.P.	4.56


PRODUCT REALIZATION
FOR MID-CONTINENT REFINERIES
POSTED CRUDE PRICES - MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
DOLLARS PER BARREL
0
1
2
3
J F M A M J J A S O N D
1947
F M A M J J A S O N D
1948
F M A M J J A S O N D
1949
F M A M J J A S O N D
1950

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil

XUM

EQUIPMENT MEN ... in the News

Youngstown Changes Key Executive Personnel

At the annual meeting of directors of Youngstown Sheet & Tube Co., several changes in officers were made:

FRANK PURNELL

Frank Purnell was elected chairman of the board of directors. Purnell first came with Youngstown in 1902 and he has been president of the company since January 1930.

J. L. Mauthe was elected president of the company. Mauthe graduated from Pennsylvania State College, and joined National as assistant superintendent of blast furnaces. He went with Youngstown in 1935 and was appointed general superintendent of the Youngstown district in 1937. In 1943 he was elected vice president in charge of all operations.

J. L. MAUTHE

GLOSSBRENNER

Alfred S. Glossbrenner was elected vice president in charge of operations. He attended University of Wisconsin, and came with Youngstown in 1935 as assistant superintendent of the then new hot strip mill at the Campbell works and a year later was made superintendent of that mill. In 1942 he was made superintendent of the Brier Hill works and 10 months later became general superintendent of plants in the Youngstown district. In 1947 Glossbrenner was elected assistant vice president of the company in charge of steel operations at all plants.

Tyson Smith Buys Mason Brothers Houston Plant

Tyson Smith Co. has purchased from Mason Brothers Construction Co. a large plant and pipe shop with railroad facilities, along with a brick air-conditioned office. These plant facilities have 10-ton overhead cranes and are located on approximately 5 acres adjoining Nowery J. Smith Co. at corner of Eureka and Hempstead underpass, at Houston.

Tyson Smith will carry on its steel production work, including bolted and welded tanks for oil industry, stainless steel and other work for Gulf Coast industries, and will install wire machines to weave chain-link wire for several large Southwest distributors.

Brodie Is District Manager For Canadian Tube Turns

John G. Seiler, executive vice president and general sales manager of Tube Turns of Canada, Ltd., has announced the appointment of Arthur H. Brodie as district manager.

Brodie's headquarters will be at the company's plant in Chatham, Ont., but he plans to spend considerable time in Toronto. He was associated with International Equipment Co., Toronto, before joining Tube Turns in March.

Kobe Opens New Pump Repair Shop at Odessa

Kobe, Inc., has announced the opening of its newest customer-service facility, a hydraulic-pump repair shop at Odessa, Tex. For both free type and conventional pump operations in West Texas, the new shop will provide repair service.

The shop has complete facilities for tearing down, reassembling, and testing pumps. The facilities are similar to those recently set up in Kilgore for East Texas operations.

Visitors to Kobe, Inc.'s recent shopwarming in Odessa were greeted by Rufus Kirk, district representative; W. F. (Pete) Slater, manager of hydraulic sales; J. T. Lewis, district manager; and Ralph Nelson, district field manager.

Norman Malone to Handle Lunkenheimer Advertising

Norman Malone & Associates, Akron advertising agency, has been appointed to handle the advertising of Lunkenheimer Co., large Cincinnati valve manufacturer established in 1862.

The agency's responsibilities for Lunkenheimer space advertising will begin with August issues of publications currently scheduled and immediately with any new media added to Lunkenheimer's program.

In addition to space advertising, Norman Malone & Associates will direct Lunkenheimer's sales promotion, merchandising, and public relations.

Randolph Goes to Dallas For Oil Base, Inc.

Thad Randolph, sales manager, Oil Base, Inc., has been transferred temporarily to the Mid-Continent area to relieve J. A. Moore, Oil Base vice president, who returns to headquarters in Compton, Calif.

THAD RANDOLPH

Randolph will be stationed at Dallas office of Core Laboratories, Inc., and will serve as liaison director between the two companies, helping with the training of Core Lab sales engineers in the use of Black Magic and Oil Base mud-conditioning products. He will cover all areas served by Core Lab.

Hearn Assigned Additional Territory by Halliburton

Hosea P. Hearn, superintendent of Halliburton Oil Well Cementing Co., Denver, representing the Rocky Mountain area, has been recently assigned an additional division, which includes the Pacific Coast area.

Hearn's appointment as superintendent of the Pacific Coast area is for an indefinite period, in view of the illness of C. T. McGuire, who is on a temporary sick leave. Hearn will continue with his duties in the Rocky Mountain area besides those of the Pacific Coast. He will maintain his residence in Denver.

Natural Gasoline Supply Men Elect New Officers

L. L. Dresser, Dresser Engineering Co., Tulsa, was named president of the Natural Gasoline Supply Men's Association at a meeting held recently in Fort Worth in conjunction with the meeting of the Natural Gasoline Association of America. New officers of the supply association shown above are M. A. Ellsworth, Fluor Corp., Ltd., treasurer; Dallas S. Deem, American Air Filter Co., first vice president; Dresser being congratulated by outgoing president, J. N. McClure, Elliott Co.; and M. E. Duncan, Johns-Manville Sales Corp., second vice president.

Birchard Appointed General Manager of Enterprise

Appointment of Paul I. Birchard as vice president and general manager of Enterprise Engine & Foundry Co. has been announced. Birchard has been identified with the diesel-engine industry for over 20 years, and has been associated with Enterprise since early in 1946.

Birchard joined Enterprise as assistant to the executive vice president. In the same year he became head of production at Enterprise's South San Francisco plant, and subsequently general works manager. Since January 1948 he has been vice president in charge of enginering and manufacturing.

Bethlehem Announces Sales Department Shifts

Bethlehem Supply Co. has announced several promotions and changes in its field sales personnel.

F. J. Wilbanks, former field representative at Seminole, Okla., has been promoted to the position of store manager and field representative at Seminole, replacing H. R. Hoover, who died after a very short illness. E. L. Sharp, formerly assistant store manager at Duncan, Okla., has been transferred to Seminole as field representative to assist in the field sales in that area.

R. F. Wyers, formerly store manager and field representative at Lindsay, Okla., has been transferred in the same capacity to the Duncan store. F. D. Cox has been transferred from Casper, Wyo., to Duncan as assistant store manager. J. C. LeFlore has been promoted from field representative to store manager and field representative of the Lindsay store. Richard Evans, Jr., formerly in the Oklahoma City store, has been transferred to Lindsay and promoted to field representative. C. W. Young, formerly special representative at Garden City, Kans., has been transferred to Russell, Kans., and promoted to store manager and field representative. L. R. Cousland, formerly assistant store manager at Great Bend, Kans., has been transferred to Garden City as special representative replacing C. W. Young.

H. B. Karstetter, formerly field representative at Casper, has been promoted to the position of store manager and field representative at Casper. T. C. McCord has recently been employed as a field representative in the used material department at Kilgore, Tex. C. A. Patterson, formerly in the Odessa, Tex., store, has been transferred to Snyder, Tex., and promoted to field representative.

G.E. Launches More Power To America Display Train

General Electric Co. has unveiled its More Power to America Special, the biggest electrical display kit ever built.

Almost a quarter-mile long, the 10-car exhibit train displays in one series of related exhibits, the complete range of product for the production, distribution, and industrial utilization of electric power.

Believed to be unique in industrial marketing history, the silver streamliner is filled with exhibits of more than 2,000 electric products, systems, and techniques. The special train launched on the rails by the company's apparatus department, is in New York on the first lap of a nationwide tour. It will visit approximately 150 key industrial centers during 1950 and 1951.

Hundinger Named as New Bedford Secretary

New Bedford Cordage Co., New Bedford, Mass., announced at its annual stockholders' meeting the appointment of George W. Hundinger as secretary of the company.

Hundinger has been with the company over 30 years. Until his appointment, he has been director of oil-field sales and prior to that, Chicago branch manager. He will continue to be in charge of oil-field sales at the company's New York office.

Hooker Electrochemical Makes Executive Changes

Following the annual meeting of stockholders and the board of directors, several major changes in positions of executives were announced by officers of Hooker Electrochemical Co.

Hiram B. Young, formerly superintendent of the Niagara Falls plant, was made works manager. Frank W. Dennis, formerly personnel director

M-C-M Acquires Partial Interest in Line Scale Co.

M-C-M Machine Works Co., Oklahoma City, has recently acquired partial stock ownership and management of Line Scale Co., Inc., according to M. G. McCool, one of the owners of M-C-M. An extensive expansion program is anticipated in the near future. This will include considerable remodeling of the present plant to increase and modernize production facilities.

XUM

and employment manager, was named director of industrial relations for plants at Niagara Falls, N. Y.; Tacoma, Wash., and subsidiary Hooker-Detrex plants at Tacoma, and at Ashtabula, Ohio. Leonard F. Bryant, formerly assistant production superintendent, is now plant superintendent, and Walton B. Scott, formerly assistant technical superintendent, is now technical superintendent.

V. G. Ibert Joins Cameron Iron Sales Department

V. G. IBERT

V. G. Ibert has joined the Cameron Iron Works sales department to specialize in the sale of the new Cameron nonlubricated lift plug valve, according to an announcement by E. L. Lorehn, vice president and general manager of Cameron. Ibert is well known among Gulf Coast refiners. He was previously employed as an operator at the Abercrombie-Harrison gasoline plant at Sweeney, Tex., and the Cities Service refinery and Cit-Con Oil Corp. at Lake Charles, La.

Feldmann Is Worthington V.P. in Charge of Sales

H. C. Ramsey, president of Worthington Pump & Machinery Corp., has announced that Walter H. Feldmann, who has resigned as president of the corporation's subsidiary, Electric Machinery Manufacturing Co. of Minneapolis, has been named vice president in charge of sales for Worthington.

John J. Summersby will become vice president in charge of purchases; Frederic W. Thomas will become general manager of purchases; and Carleton Reynell, general representative, sales and purchasing departments.

Richard H. Olson, formerly vice president in charge of sales, was elected by the board of directors of Electric Machinery & Manufacturing Co., to become president, succeeding Feldmann.

Feldmann graduated as an electrical engineer from Baltimore Polytechnic Institute in 1915 and joined Electric Machinery in 1922. He was elected president of the company in 1944 after having served as district manager, general sales manager, vice president, and general manager.

Summersby joined Worthington in 1916 as a student engineer and has been with the firm continuously since that time. He has served as salesman, district sales manager, works sales manager, assistant vice president, and vice president in charge of sales.

Anchor Petroleum Issues Revised L.P.G. Booklet

O. L. Williams, superintendent of equipment, Anchor Petroleum Co., has completed revising the booklet, "Proper Handling of Butane and Propane in Railroad Tank Cars," according to an announcement by W. A. Baden, Anchor president.

O. L. WILLIAMS

The booklet was originally written by Williams and recent improvements in tank-car gaging equipment has made revisions necessary. The publication deals with safety practices, characteristics of L.P. gases, gaging equipment, and maintenance instructions on control valves.

E. R. McPherson Elected to Jenkins Bros. Board

Edward R. McPherson, Jr., was elected to the board of directors of Jenkins Brothers, one of the nation's oldest valve manufacturers, it was announced by Farnham Yardley, chairman of the board, at the company's annual stockholders meeting. McPherson, a graduate of Harvard University and Cornell Law School, was formerly associated with the law firm of White & Case, New York, and with Phillip Morris Co., Ltd.

Wagner Electric Sales Territories Realigned

The southern portion of the sales territory served by the St. Louis electrical division branch of Wagner Electric Corp. has been set up as a separate unit, with headquarters in Memphis and a sales office in New Orleans. A. C. Allen will remain at Memphis as branch manager of the newly established territory.

The remaining territory, with a main branch in St. Louis and a subbranch in Indianapolis, will be under the direction of J. J. Scheid, who succeeds H. N. Felton as manager of the St. Louis branch. Felton was recently elected vice president in charge of sales of the Wagner company.

United States Steel Advances L. M. Parsons

Lewis M. Parsons, formerly assistant to vice president in charge of sales, has been elected a vice president, director, and member of the executive committee of United States Steel Corp., it has been announced by Benjamin F. Fairless, president.

L. M. PARSONS

Parsons will continue to be located at Washington, D. C. He entered the employ of Bethlehem Steel Co. in 1919, and in 1936 became manager of sales at Philadelphia for that company. He became vice president and general manager of sales and a director and executive committee member of Jones & Laughlin Steel Corp. in 1938, and joined United States Steel on January 1, 1945.

George Opens Snyder Yard

Wood George has announced the opening of the new office and warehouse of George Rental Service in Snyder, Tex. The company will maintain a full line of rental drilling equipment at the Snyder location.

(Continued on page 155)

Natural Gas Equipment Occupies New Offices

Natural Gas Equipment, Inc., Pasadena, Calif., representative in West Coast states for Valve & Primer Corp., and Surface Combustion Corp., has recently moved to this new building where it has acquired increased office and warehouse facilities, according to J. V. Thomas and R. L. Grutzmacher of that organization. The firm is also agent for Janitrol heating equipment, Webster gas burners and controls, Askania control equipment, and its own line of oil and gas burners, regulators, and liquid-level-control equipment.

Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY...

CLASSIFIED ADVERTISING

UNDISPLAYED CLASSIFIED 12c a word one issue. 10% Discount three or more issues. $3.00 minimum charge. Blind Box in our care counts nine words. Payable in Advance.

DISPLAY CLASSIFIED
$12.00 a column inch one issue . . .
10% Discount three or more issues.

EQUIPMENT FOR SALE

ONE new 40′ x 40′ x 12′ corrugated aluminum building; double sliding door; single door and window; steel structure. Located: Bunkie, Louisiana. Anchor Gasoline Corp., Phone 54-5201, Tulsa, Oklahoma.

REBUILT BOILERS

90 HP. Donovan Oil Field Type Boiler, S.W.P. @ 175#, Complete with standard trim. Peerless Boiler Company, 421 North Cincinnati, Tulsa; 2015 NE Park Place, Oklahoma City.

FOR SALE: Model L-107 Allis-Chalmers Fred E. Cooper winch unit for deep well servicing. Excellent condition. Priced to sell. Degen Pipe & Supply Co., Box 107, Red Fork Station, Tulsa, Oklahoma.

SEISMOGRAPH EQUIPMENT FOR SALE: Two 2-Ton Chevrolet Coleman 4-Wheel Drive water trucks. 500 gallon tank completely winterized, vacuum fill, Tulsa winch, etc. Excellent condition, low mileage. Original Cost $6600.00 — Sale Price $4000.00.

One ½-Ton Chevrolet crew and field service unit. Bed enclosed with steel, cab with heater, 65 gallon gas tank with gear pump. 7:50 x 15 tires. Low mileage. Original Cost $2800.00—Sale Price $1800.00. Riverside-6811, Dallas, Texas

FOR SALE: 4850′ Spang 13.30# 3½" Drill Pipe—Used very little—Protectors. 1—3½" Kelly—New, 1—6′ x 38′ Subbase, 3—16′ x 24′ x 3.5′ pipe racks, Walkway and stairway. Located Newcastle, Wyoming. Contact: Graham Powell Drilling Co., Centralia, Illinois.

FOR SALE: New 10,000 Bbl. API Columbian Bolted Steel Tank with tools $6500 FOB Newark, N. J. Darien Corp., 60 E. 42nd St., N.Y., N.Y.

FOR SALE: One, type-100 National Drilling Rig has drilled only two wells. With 800,000 pounds capacity jack-knife derrick. Box D-448, The Oil and Gas Journal, Tulsa, Oklahoma.

Several Army Surplus 4½" x 6" Gaso Duplex 1860 Pumps — two piece skid mounted with Chrysler 8 cylinder engines. Will sell pumps only or complete units about half price.

H. H. COFFIELD
ATTN: W. H. Orr
Phones: 132—Rockdale, Texas
A-86084—Houston, Texas

FOR SALE—NEW ATTRACTIVELY PRICED

2—30" Merco Lub. Plug Valves—200#—Fig. 1169
3—18" Merco Lub. Plug Valves—150#—Fig. 1169
1—14" Crane 475½—130# Gate—FF
1—14" Chapman 600# Gate RTJ
12" Daniel Orifice Fitting SA—651 w/600 RTJ FGS
8" Daniel Orifice Fitting SA—169 w/150 RF FGS
(Both complete with meter runs)
Also $86,000 stock new plugs, valves, welding fittings and flanges at our Tulsa warehouse.

GREEN PIPE & SUPPLY CO.
Phone 2-8555, Tulsa, Okla. P.O. Box 1383

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

FOR SALE: 36-L Bucyrus Spudder. A-1 condition. Complete line of drilling tools 15" down. Sand pumps, swabs, dog house and light plant. New 4000′ lines. No Junk! Located Oklahoma. Box 378, Cherryvale, Kansas.

FOR SALE: Wilson Mogul drilling rig with portable derrick complete. Suitable for 4500′ depth. Now running in Bebee Field, Pontotoc County, Oklahoma. Contracts available. Lake Oil Company, Ada, Oklahoma.

1 String Complete Rotary Drilling Tools, with Lee C. Moore Heavy Duty Mast, Cardwell Draw Works, 7¼ X 14 Wheland Pump and W.A.K. Waukesha Motor. Tools located near Olney, Illinois. Priced right to sell. Either call 48542 or write H. M. Williams Drilling Company, 701 Bitting Building, Wichita, Kansas.

FOR SALE: Two 2½" x 1⅞"—One 3" x 1½"—One 3" x 1¾"—Two 4" x 1¾"—Four 4" x 2" Conventional Type Kobe Production Pumps. These Pumps are in good condition, are ready to run. Peppers Refining Co., 2917 First National Bank Building, Oklahoma City, Okla.

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FOR SALE
(SUBJECT TO PRIOR SALE)

3 Bolted tanks, 2 in original crates and one assembled. (100 Bbl.). 69′-14" 57# Drive Pipe; 170′-10¾" 41# Drive Pipe; 407′-10¾" 32.75# Casing 8Rd. Thd. Smls.; 3045′-8" 24# Casing 8Rd. Thd. Smls.; 6286′-7" 23# Casing 8Rd. Thd. Smls.; 8101′-3" 9.20# Tubing Smls.; 1453′-2½" Tubing EUE Smls.; 14,226′-2" 6.40# Regular 10Rd. Thd.; 375′-¾" Pumping rods; 9-5" Orbit Gate Valves; 9-3" Orbit Gate Valves; 3-2" Orbit Gate Valves; 3-2⅞" x 6" Parmco Combination Packer; 1-2⅛" x 6" Larkin Screw Trip Packer; 1-3" x 6" Parmco Packer; 1-2⅞" x 6" Gas Anchor Packer. M. B. Belden Office at 425 2nd St. N. W., Canton 2, Ohio, Phone 4-6147.

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Gaso, Byron Jackson, Aurora, Wayne, Lombard, & Hale Fire Pumps with Engines, 1½ to 25 KW Generator Sets or Light Plants, Engines, Suction Hose, Fire Hose, Victaulic Couplings & Etc. Write for listing. H. A. McCarthy, 310 Thompson Bldg., Phone 5-3296, Tulsa, Oklahoma.

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5—Used "Caterpillar" D13000 Power Units with Gaso Model 1742 5x10 pipeline pumps, complete with skids, V-belt drive—and guard—Immediate Delivery.

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XUM

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BARGAIN
4—100 HP Superior Twin Gas Engine COMPRESSORS—now operating in Oklahoma. Alfred B. Kern, 223 Wright Bldg., Tulsa, Oklahoma.

FOR SALE—Several used Mayhew 1000 and 600 rotary type drills, mounted on 2-ton Chevrolet trucks. Many in operation at present. Inquire at 8800 Lemmon Ave., Dallas 9, Texas. Phone Dixon 4-2671.

FOR SALE—127′ "Oilwell" Drilling Mast, 515,000 capacity, complete with six-foot substructure. Call or write H. Waggoner, Phone 64-1413, or P.O. Box 4657, Oklahoma City, Okla.

FOR SALE: 28—4 inch Series 900 Raised faced and 16—8 inch Series 900 Raised faced weld neck flanges. Good condition. Located Otis, Kansas. Prices will be quoted upon inquiry. Kansas - Nebraska Natural Gas Co., Inc. P. O. Box 297, Hastings, Nebraska.

CORE Drill Equipment for Sale: Two "Franks" truck mounted core drills, 2,000′ capacity; one shop built truck mounted core drill, 1,600′ capacity. All mounted on KR-11 International trucks. Four KB-7 International oil field trucks with jin poles and model 34 Tulsa winches. Four pole trailers with bolsters, three of them equipped with dollies for holding pipe loads. Approximately 2,500′ used 2⅜″ x 20′ drill pipe with 3⅜″ tool joints. Contact Mr. K. J. Reid or Mr. W. H. Hawkes, P.O. Box 1654, Oklahoma City. Telephone 2-6381.

COOPER Single Drum Winch Tractor, Model W-201-26, with 45-foot mast, A-1 condition. $2250.00. Rogers Pipe & Supply Co., Tulsa, Phone 3-2072.

1—45 STAR Spudder with motor and complete string of tools from 15½″ down to 6″. Will sell with tools or without tools. Harvey Creek, 3106 North Market, Wichita, Kansas. Phone 5-2855.

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Inventory Includes

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$100,000 in
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COTTON VALLEY, LA.
PHONE: COTTON VALLEY 26

EQUIPMENT FOR SALE

FOR SALE: One 6′ X 27′6″ Treater, Type ICA, Special BF103 National Tank Co., Heating cap. 500,000 B.T.U. Serial #61015. 750 dollars, FOB Russell County, Kansas. Write to Great Bend Iron & Metal, Box 414, Great Bend, Kans.

FOR SALE: Two strings of 4½″ O.D. Drill Pipe. This pipe has not seen much use and is in excellent condition. There are 5000′ of 4½″ O.D. Hughes Full Hole Bottleneck Tool Joints, API Threads. Also 3300′ of 4½″ O.D. Hughes Full Hole, API Threads. Would be interested in selling outright or trading for 5½″ and 7″ Casing. Joe Golden, Box 1362, Odessa, Texas. Phone No. 2542.

FOR SALE: 1—36-L Bucyrus Rig, 1948 model, complete with all tools. Phone 2032. Henderson, Kentucky.

BOILERS FOR SALE: 18 Code Oil Field Boilers, 50 to 87 H.P., 100 to 200 Lbs. W.P., Operated under Hartford into 1948, not fired since. Located on Leases vicinity Pampa, Texas. Offered subject to prior sale $500.00 to $700.00 Each, as is where is. Contact W. L. Godfrey or Max Harbison, Kewanee Oil Company, Pampa, Texas.

1 BUCYRUS-ERIE 36L Spudder with third leg, A-1 condition, latest model, new lines, ⅞″ & ⅝″ x 4000′, complete with dog house, light plant, 210 bbl. welded tank on skids, drilling tools, casing outfit, 15½″ to 6″, sills, derrick floors and house, 1948 2½ Ton Dodge Winch Truck, and 3 Ton Dual Wheel Trailer.

1 Bucyrus-Erie 36L Spudder, 1948 Model, A-1 Condition, new lines, ⅞″ & ⅞″ x 4500′, complete with dog house, light plant, 57′ A-Mast, drilling tools from 15½″ to 5½″, derrick floor and house and all necessary timbers for drilling big hole; 1948 Model ½ Ton Chevrolet Pickup. Russell Drilling Co., Box 572, Russell, Kansas.

ONE Skid mounted 5 x 10 Gardner Denver Pump with 525 Buda Engine used to drill five shallow holes—$3000.00. Riverside-6811. Dallas, Texas.

FOR SALE: Super Model Wilson skid winch, powered with 6-MZR Waukesha engine. Priced less than 50% of new cost. Melton Supply Company, Box #1360, Seminole, Oklahoma.

PORTABLE WELDER
WILSON WASP, good working condition, reasonable. Brown Boiler, Inc., Box 26, Claremore, Oklahoma, Phone 1375.

FOR SALE: At Okla. City Warehouse, 1—Allis-Chalmers model UM-4 Skid Type Well Servicing Winch, No Mast—Cities Service—Patridge—Bartlesville, Oklahoma.

CULVER Vertical Furnaces for exfoliating Perlite $10,000 compared to $100,000 for old style, also purest of Perlite for sale. Particulars Box 2153-OJ, Denver, Colo.

EQUIPMENT WANTED

SPUDDER OR MACHINE: 3500 foot capacity with motor and tools. State price. Box D-483, The Oil and Gas Jourani, Tulsa, Oklahoma.

WANTED: 1500 Failing or similar size drill. Truck mounted. Must be complete and ready to drill. Give complete description, price and location. No Junk wanted. Box 378, Cherryvale, Kansas.

INTERESTED in small portable double-mast rig, capable of drilling to approximately 2000 feet, with or without drill pipe. Equipment must be in good condition and reasonably priced. Preferably located in Southwest Texas. Contact:

MAKIN DRILLING COMPANY
Box 131, Hobbs, New Mexico, Phone 131

HELP WANTED

PARTY CHIEF-SUPERVISORS for South America. Must have several years experience gravity exploration. Expenses, salary commensurate to experience. Only qualified personnel apply, Exploration Surveys, Inc., 5615 Daniels Avenue, Dallas, Texas.

WANTED: EXPERIENCED High Pressure Absorption Plant Operators. Must be familiar with absorption, distillation and fractionation process in cycling operations. South Texas location. Give experience in answering. Box D-491, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

NATIONAL oil trade publication has exceptional opportunity on editorial staff for graduate engineer preferably with two or more years experience in field work. Writing experience desirable. Box D-482, The Oil and Gas Journal, Tulsa, Okla.

FOREIGN and Domestic Oil Employment Directory (including late supplement of oil companies and drilling contractors in Western Canada). Over 500 listings in drilling, production, refinery, natural gasoline, pipelines, geological, exploration, supplies, manufacturers, services and refinery and pipeline contractors, showing where to apply for jobs. Price $5.00. Oil Industry Mailing List, Box 2603, Tulsa, Okla. (Our 30th year).

WANTED: Man located in West Texas to handle technical specialities, on commission, such as control valves, steam traps, etc., under well known organization with main offices and warehouse in Houston. Prefer man already established but desires to extend his activity. Box D-469, The Oil and Gas Journal, Tulsa, Oklahoma.

EVALUATION ENGINEER—A progressive and substantial Mid-Continent oil company desires the services of a fully qualified oil property evaluation and/or appraisal engineer. State age of applicant, scholastic training, former affiliations, years and record of experience, present assignment, date of availability, and expectant salary. All applications will be held confidential. Address all inquiries: Box D-486, The Oil and Gas Journal, Tulsa, Oklahoma.

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SEVERAL openings are available for research in secondary recovery of petroleum. Some teaching may be required; salary commensurate with qualifications. Candidates will please send complete record of education and experience plus a small photo with their applications to Director, Mineral Industries Experiment Station, The Pennsylvania State College, State College, Pa.

GAS ENGINEER WANTED
By consulting engineering firm located in New York City. Applicant should have had experience with either transmission or distribution of natural gas. Analytical ability desired in connection with certificate and rate work. Age 35-45. Reply giving age, education, experience, references and salary required. All replies kept confidential. Write Box D-487, The Oil & Gas Journal, Tulsa, Oklahoma.

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Radio City Station
New York 19, New York

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GRADUATE CHEMIST: 10 years experience in soap products, synthetic rubber, quality control, supervision. Write: Box D-465, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER: Refinery, Gasoline Plant. B.S. in Petroleum Engineering. Six years varied petroleum experience in Laboratory, Drafting, Construction, Instrumentation and Process Design of both refineries and gasoline plants. Box D-478, The Oil and Gas Journal, Tulsa, Oklahoma.

INDUSTRIAL RELATIONS MANAGER: Can relieve Management of all responsibilities labor contract negotiations, grievance handling, safety program, training program, etc. Box 474, The Oil and Gas Journal, Tulsa, Oklahoma.

PROCESS ENGINEER - TECHNOLOGIST: B.S. Ch. E. 5 years diversified experience. 3 years refinery design, development, trouble shooting. Seeking career opportunity. Top references, available promptly. Age 28, family. Box D-485, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: 28, single, Civil Service rating GS-7, 2 years experience ground water work, desires better position. Will consider offers over $4,500 per year and expenses. Box D-490, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 131, Ph. No. 131, Hobbs, New Mexico.

PRODUCTION and Drilling Supervisor: Desires immediate change. 8 years with major, Illinois basing drilling, completion, production, and equipment; 1 year oil field construction. Graduate Petroleum Engineer. Age 31, family. Box D-467, The Oil and Gas Journal, Tulsa, Oklahoma.

ACCOUNTANT-AUDITOR, CPA, Fifteen years diversified accounting and tax experience, principally in Oil Industry. Available immediately. Box D-488, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED

WANTED: SURPLUS Chemicals, Oils, Waxes, Solvents, Wastes and Residues of all kinds. Chemical Service Corporation, 98-06 Beaver St., New York 5, N. Y.

PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell Registered Patent Attorneys, Suite 418 815-15th Street, N.W., Washington 5, D. C

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PERSONAL

ANYONE KNOWING WHEREABOUTS OF

R. L. CALKINS

who owns royalties in Wayne County, Illinois, please get in touch with Skiles Oil Corp., Mt. Carmel, Illinois.

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DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington New Mexico.

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Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1225 Great Falls, Montana.

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LEASE AND DRILLING BLOCKS

IF you've got real oil proposition or royalty that you wish to sell, or any defaulted municipal or special assessment bonds, bring your deal to me. Dyer-OJ, 1835 Champa, Denver, Colorado.

FOR SALE: Oil and Gas Leases and drilling propositions in shallow territory of Allen, Simpson, and Warren Counties, Kentucky, W. P. Harley, Bowling Green, Kentucky.

FOR SALE: Undivided one-half interest in 5% over-ride royalty in block of about thirty thousand acres SOUTH DAKOTA on which drilling is contemplated in 1950. Also have leases for sale or will do order buying for those who want protection in this South Dakota play. John F. Schoof, Gettysburg, S. D.

FOR SALE: Inside leases, drilling propositions. Shale gas. West Virginia. Also Royalties. Some settled oil production Berea. Box D-484, The Oil and Gas Journal, Tulsa, Oklahoma.

OFFERING 30,000 acres leases Valencia County, N. Mex., 10,000 Hidalgo County, 6,000 Torrance County, $1.50 acre—17,000 acres Wallace County, Kansas, $1. Write if interested, Box 2153, Denver, Colo.

HAVE two thousand acres prospective oil land, near present production, good geology. Also good agricultural and grazing. Will sell half undivided interest and join purchaser in mutual development. Experience and reference requested. Box D-489, The Oil and Gas Journal, Tulsa, Oklahoma.

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Suite 200, Grand Pacific Hotel
Bismarck, North Dakota
(Member National Oil Scouts and Landmen Association. References exchanged).

LEASE AND DRILLING BLOCKS

OIL AND GAS LAND FOR LEASE!!
WE HOLD 3,800 acres of Government & State leased lands, some of it close to producing areas in Carbon and Sweetwater Counties. Will sell some of our royalty. L. J. Lincecum & Associates, 817 West Pine Street, Rawlins, Wyoming.

FOR SALE: New 50 acre lease, Shelby County, Texas, Humble block, priced at $5 per acre, write for information. C. A. Parker, Office Polley Hotel, Center, Texas.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing, Catalog and Samples on request. Burkhart Printing & Stationery Company, 115 South Cincinnati, Tulsa 3, Oklahoma.

FOR LEASE

ATTRACTIVE office space to lease in new oil building in Key West Texas oil city—Abilene, Texas. Ready for occupancy on or about Sept. 1st. Fire-Proof, Year around air-conditioning, janitorial service and parking space adjacent to building. Modern selected office arrangements. Contact Jimmy Partin, Tel. 8561, Abilene, Texas.

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FOR SALE: 8000 sq. ft. new, one-story building with extra storage ground, truck docks and railroad switch available, Larned, Kansas. Suitable for oil well supply or business serving oil business. Immediate possession. Easy terms. McNaghten Investment Company, Hutchinson, Kansas.

FOR SALE—MAPS

UP-TO-DATE two tone oil and gas Map of Texas on 38" wall mounting spring roller. Shows all Oil and Gas fields in Orange Color up to March 1, 1950. Geophysical prospects are also shown in black in a few important counties. Price $10.00. Ultra-Geophysical Service Company, P. O. Box 1231, Fort Worth, Texas.

BUSINESS OPPORTUNITIES

WANT about $5,000 for small refinery deal in Montana. Abnormal returns from investment. Details — Box 2181, Denver, Colo.

EQUIPMENT MEN

(Continued from page 152)

Menster Gets B & W Tube Division Promotion

The appointment of John A. Menster as assistant manager of sales for the welded tube division of Babcock & Wilcox Tube Co., has been announced by L. E. Jeanneret, manager of sales.

Menster is a graduate of Ohio University, Athens, Ohio, and has been with Babcock & Wilcox since 1943, starting in the general sales office and serving as manager of the office from 1944 until 1947. Since that time he has been assigned to special projects and recently has been actively engaged in sales development. He will continue to make his headquarters in the general sales office, at Alliance, Ohio.

Metal & Thermit Moves

After 35 years in downtown New York, Metal & Thermit Corp. is moving its general offices to the midtown area. The company's address, as of May 1, will be 100 East 42nd Street, New York City.

XUM

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CALENDAR OF EVENTS

May

American Petroleum Institute, central committees on accident and fire prevention, midyear meeting, Atlantic City, N. J., May 15-18.

American Gas Association, production and chemical conference, Hotel New Yorker, New York, May 22-24.

American Institute of Chemical Engineers, regional meeting, New Ocean House, Swampscott, Mass., May 28-31.

Gas Technology Short Course, Texas College of Arts and Industries, Kingsville Tex., May 29-31.

June

National Oil Scouts and Landmen's Association, Skirvin Tower Hotel, Oklahoma City, June 8-10.

American Society of Mechanical Engineers, oil and gas power division, Lord Baltimore Hotel, Baltimore, June 12-16.

Pennsylvania Grade Crude Oil Association, Hotel William Penn, Pittsburgh, Pa., June 15-16.

Petroleum Equipment Suppliers Association, annual membership meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., June 25-27.

American Society of Mechanical Engineers, Hotel Statler, St. Louis, June 19-23.

Canadian Gas Association, annual convention, Manoir Richelieu Hotel, Murray Bay, Quebec, June 19-24.

Kentucky Oil and Gas Association, annual meeting, Lexington, Ky., June 22-23.

American Society for Testing Materials, annual meeting Chalfonte-Haddon Hall, Atlantic City, N. J., June 26-30.

American Petroleum Institute, midyear division of production and standardization conference, Brown Palace Hotel, Denver, June 26-30.

July

Institute of Petroleum, oil shale and cannel coal conference, Glasgow, Scotland, July 3-7.

Pacific Coast Gas Association, annual convention, Seattle, Wash., July 31-August 3.

August

Interstate Oil Compact Commission, summer meeting, French Lick, Ind., August 3-5.

September

National Chemical Exposition, Chicago Coliseum, Chicago, September 5-9.

American Society of Mechanical Engineers and Instrument Society of America, Municipal Auditorium, Buffalo, N. Y., September 11-15.

National Petroleum Association, Hotel Traymore, Atlantic City, N. J., September 13-15.

Instrument Society of America, annual instrument conference and exhibit, Memorial Auditorium, Buffalo, N. Y., September 18-22.

American Society of Mechanical Engineers, petroleum mechanical engineering conference, Roosevelt Hotel, New Orleans, September 25-27.

October

American Gas Association, annual convention, Atlantic City, N. J., October 2-6.

Mid-Continent Oil and Gas Association, Texas division, Dallas, October 4-5.

Petroleum Branch, American Institute of Mining and Metallurgical Engineers, Mid-Continent meeting, Roosevelt Hotel, New Orleans, October 4-6.

American Association of Oilwell Drilling Contractors, annual meeting Mayo Hotel, Tulsa, October 9-10.

Petroleum Branch, American Institute of Mining and Metallurgical Engineers, West Coast meeting, Elks Club, Los Angeles, October 12-13.

November

Mid-Continent Oil and Gas Association, Louisiana-Arkansas Division, annual meeting, Roosevelt Hotel, New Orleans, November 2-3.

American Petroleum Institute, annual meeting, Biltmore and Ambassador Hotels, Los Angeles, November 13-16.

American Society of Mechanical Engineers, Hotel Statler, New York, November 26-December 1.

December

American Institute of Chemical Engineers, annual meeting, Columbus, Ohio, December 3-6.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month. Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

New York Nomads: June 27, golf party, Ardsley (N. Y.) Country Club.

LEGAL

360 ACRES of allotted Indian lands located in Township 2 south, Range 1 east, in the Uintah and Ouray Reservation are being advertised for lease, bids on which will be opened June 1, 1950, at 2:00 p.m. at the office of Forrest R. Stone, Superintendent, Uintah and Ouray Agency, Fort Duchesne, Utah. Full particulars may be obtained from Superintendent Stone or from Mr. J. R. Schwabrow, U. S. Geological Survey, Federal Building, Casper, Wyoming.

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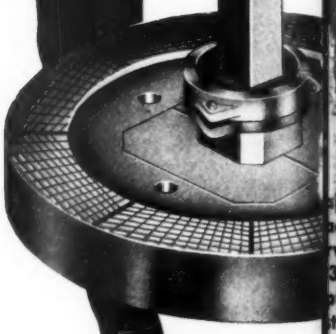

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American Iron Hex Kellys are made from *fully heat treated* alloy steel forgings for longer wear and greater resistance to torsional stresses. Driving surfaces are machine finished—and circulation holes precision bored—for smoother running and proper balance at all drilling speeds. Our manufacturing processes and scientific inspection insure straightness, joint alignment, concentricity of bore, hardness and precision threaded connections.

SQUARE KELLYS

American Iron Square Kellys are also made from a heat treated one piece alloy steel forging with top and bottom integral upset ends formed during the forging operation. The radius on the square of the driving surface is correctly formed during the forging operation. Correct forging processes plus straightness, joint alignment, concentricity of bore, hardness and precision threaded connections, make the American Iron Square Kelly the best balanced square kelly available.

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